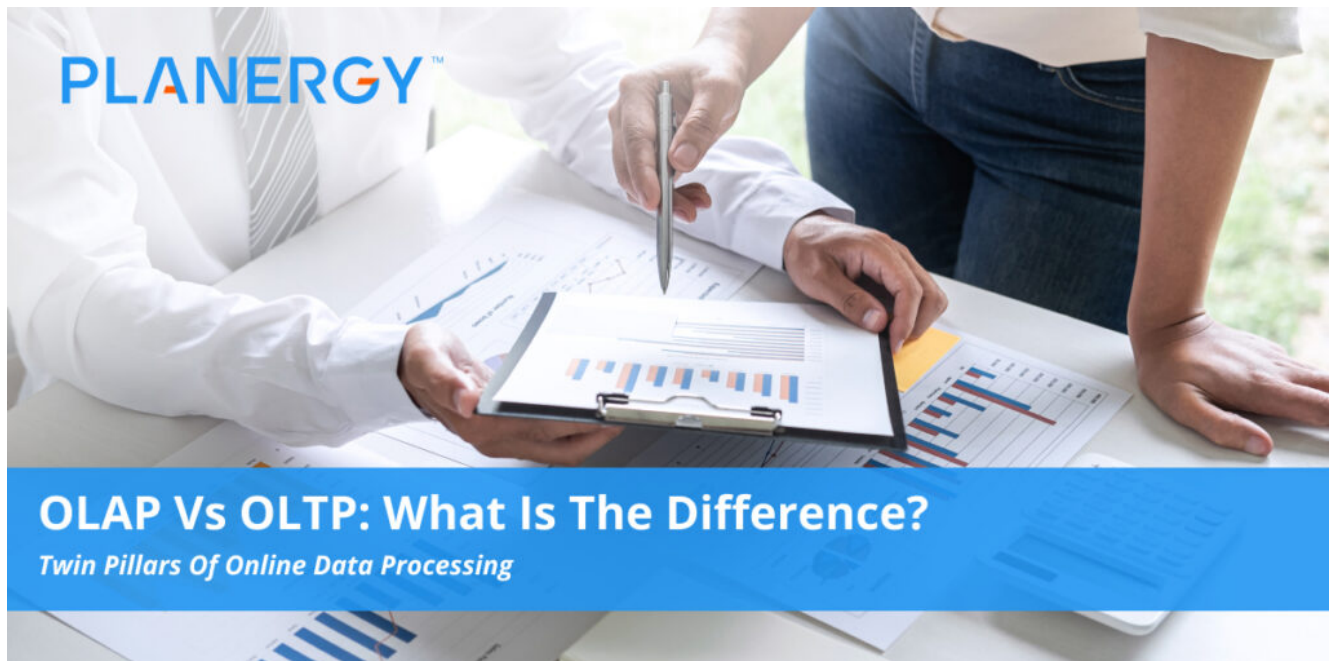


OLAP Vs OLTP: What Is The Difference?



Few can deny the growing importance of big data in modern commerce. But as more and more companies embrace and transition to digital, data-centric processes, developing a thorough understanding of the tools used to process all that big data has grown more important, too.

Two powerful, interrelated data processing tools—*online analytical processing*, or OLAP, and *online transaction processing*, or OLTP— play an especially critical part in helping companies gain transparency into, and control over, their data and spend.

A Tale of Two Online Processing Tools

To understand the relationship between OLAP and OLTP, it's necessary to understand the role each plays in data processing.

OLAP is the classification given to a specific type of software tools designed to analyze data (often from multiple database systems at once) in order to provide actionable insights.

These insights can be strategic or tactical, and touch on everything from problem

solving (e.g., “Which vendors consistently provide full contract compliance?”) to planning and decision-making (e.g., “Which processes will yield the most value and cost savings from automation?”).

OLAP systems are what’s known as *data warehouse* systems, as compared to their simpler database-driven counterparts.

ASPECT	DATA WAREHOUSE	DATABASE
Ideal Workload:	Analytics and reporting	Processing transactions
Source of Data and Amount of Data:	Multiple diverse data sources, either discrete or interconnected	Drawn from a single source, e.g. a transaction system
Query Types:	Complex and relatively few	High volume, simple, and short. (Fast query.)
Data Collection:	Bulk batch jobs	Designed for continuous and immediate updating to speed transaction processing and accuracy.
Data Normalization:	Star Schema or Snowflake Schema (Denormalized)	Static schemas (normalized)
Storage:	Uses columnular storage to simplify and speed both access and query results.	Focused on single-row blocks for fast and frequent data additions.

Access:	Focused on minimal input/output and maximum throughput; data is accessed as required, but rarely modified.	High volumes of fast and frequent small inputs, e.g. transactions; data is accessed and modified quickly <i>and</i> frequently, requiring exceptional response times (often in milliseconds).
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Data warehousing is ideal for OLAP systems, because the goal is effective and accurate analysis of a large amount of data from multiple sources in order to produce insights that drive further actions and guide future decisions.

OLAP systems collect huge volumes of current and historical data on day-to-day transactions from OLTP databases.

For procurement teams, OLAP is a powerful ally in achieving accurate and complete spend analysis, as well as financial planning and reporting.

It analyzes data collected and stored through the use of OLTP processes to produce large-scale, strategic improvements that benefit not just procurement, but the business as a whole.

OLAP databases can be used to create what is known as an *OLAP cube*. Unlike a Rubik's Cube, which presents a challenge to be solved, an OLAP cube *assists* with problem solving by rendering the complex, inter-related data contained within the connected databases of an OLAP data warehouse as a user-friendly three-dimensional cube.

Rendering the data in this way lets end users "slice and dice" information to explore data relationships and gain insights that might not be readily apparent otherwise.

For example, procurement pros will most often encounter this cube during spend cube analysis, where the relationships between (for example) spend data, supplier compliance and performance, and cost center analysis can be used to achieve more strategic sourcing through process refinement and the removal of redundant or under-performing suppliers.

By comparison, **OLTP** shifts the emphasis away from “analysis” and toward “processing.” If OLAP is largely strategic, OLTP is tactical and transactional, focusing as it does on fundamental business tasks such as:

- Automated messaging and reminders
- Order entry and approval processing (e.g., automated P2P processes)
- Approving and issuing payments

An OLTP system has a more immediate and tactical use in procurement automation than OLAP does, as it focuses on consistent, frequent, and relatively simple processes.

OLTP systems produce the data OLAP systems rely on to achieve strategic improvements.

OLTP systems store information in the transactional databases it creates, manages, and modifies.

They don’t rely on data warehousing, but are instead traditional *database management systems* (DBMS). These systems focus on *inserting, updating, and deleting* information as required, and are focused on speed, accuracy, and data integrity.

To help ensure data integrity, OLTP databases have *atomicity* and *concurrency*.

The former ensures that the failure of any single step within a transaction will prevent it from continuing, while the latter prevents multiple users from modifying the same information at the same time.

Information is moved from OLTP systems to OLAP systems using *extract, transform, and load* (ETL) processes.

- **Extract** functions isolate and collect the desired data in a given database.
- **Transform** functions manipulate the collected data for analysis.
- **Load** functions either add the desired data to an existing database, or create a new one as required.

The goal of effective OLTP is maximum efficiency and accuracy in transactional processing, as well as absolute data integrity in support of ETL, rather than deep data analysis used to answer complex queries.

An OLTP system has a more immediate and tactical use in procurement automation than OLAP does, as it focuses on consistent, frequent, and relatively simple queries. OLTP systems produce the data OLAP systems rely on to achieve strategic improvements.

OLAP vs OLTP: Which is Right for Your Business?

Because OLTP systems provide the transactional databases OLAP applications rely on, trying to decide between the two is something of a false choice.

A better approach is to consider how best to put each of these database management technologies to work within your company's business processes and workflows.

A direct comparison, with context, is most useful when considering the issue of OLTP vs OLAP:

1. Database Design:

- OLAP systems are designed to retrieve and analyze large volumes of data from disparate sources. They are rarely modified, and not normalized. Queries are complex, large, and often multidimensional. OLAP data integrity is not a concern, but does rely upon the inherent integrity of OLTP data.
- OLTP systems are designed to manage and modify transactional databases through a large number of small, frequent updates in real time. They are the source of data for OLAP applications. Data integrity is paramount, as inaccurate or incomplete data can skew insights produced through OLAP analysis.

2. Database Applications

- OLAP systems are designed to provide insights and business intelligence for planning, decision support, and solving complex problems. Examples include financial planning, strategic sourcing, spend analysis and

management, etc.

- OLTP systems are built to support and execute fundamental business tasks. Examples include automating the P2P process, inventory management, etc.

3. Potential Challenges

- Data warehousing has traditionally been complex and expensive to build, requiring specialized training to achieve maximum utility.
- Sub-optimal OLTP design can compromise the efficacy of OLAP through incomplete or incorrect data.

As you can see, to get the most out of OLAP's business intelligence, you need rock-solid, reliable, and current data from OLTP.

An effective solution for many companies is to choose a procurement solution that includes database management and process optimization tools that work together to provide optimal OLTP data for OLAP analysis.

Data Analysis Drives Smarter Spending and Better Decision-Making

Two sides of the same data mining coin, OLAP and OLTP are essential tools for any company hoping to successfully tame the dragon of big data.

Knowing how best to leverage their individual capabilities while effectively integrating them as part of your overall business process management plan is key—as is choosing a procurement solution that supports such an integration flawlessly.

With OLAP and OLTP, you can manage your entire data stream more effectively at all levels and achieve your goals for not just lower costs and higher profits, but process improvement, competitive advantage, and strategic growth.

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