Difference Between OLAP and OLTP in DBMS

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OLAP Stands for Online Analytical Processing. OLAP systems have the capability to analyze database information of multiple systems at the current time. The primary goal of OLAP Service is data analysis and not data processing.

OLTP stands for Online Transaction Processing. OLTP has the work to administer day-to-day transactions in any organization. The main goal of OLTP is data processing not data analysis.

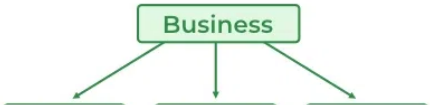
Online Analytical Processing (OLAP)

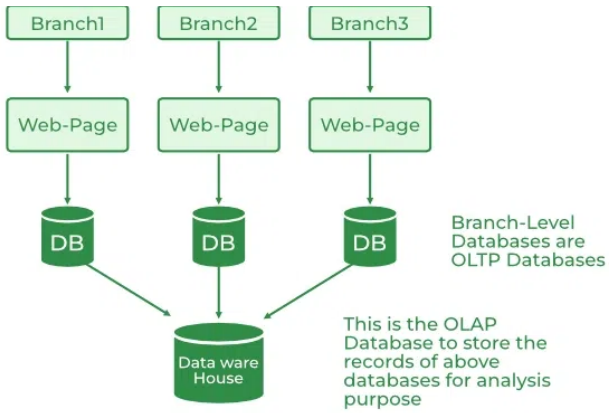
Online Analytical Processing (OLAP) refers to software tools used for the analysis of data in business decision-making processes. OLAP systems generally allow users to extract and view data from various perspectives, many times they do this in a multidimensional format which is necessary for understanding complex interrelations in the data. These systems are part of data warehousing and business intelligence, enabling users to do things like trend analysis, financial forecasting, and any other form of in-depth data analysis.

OLAP Examples

Any type of Data Warehouse System is an OLAP system. The uses of the OLAP System are described below.

- Spotify analyzed songs by users to come up with a personalized homepage of their songs and playlists.
- Netflix movie recommendation system.





OLAP

Benefits of OLAP Services

- OLAP services help in keeping consistency and calculation.
- We can store planning, analysis, and budgeting for business analytics within one platform.
- OLAP services help in handling large volumes of data, which helps in enterprise-level business applications.
- OLAP services help in applying security restrictions for data protection.
- OLAP services provide a multidimensional view of data, which helps in applying operations on data in various ways.

Drawbacks of OLAP Services

- OLAP Services requires professionals to handle the data because of its complex modeling procedure.
- OLAP services are expensive to implement and maintain in cases when datasets are large.
- We can perform an analysis of data only after extraction and transformation of data in the case of OLAP which delays the system.
- OLAP services are not efficient for decision-making, as it is updated on a periodic basis.

Online Transaction Processing (OLTP)

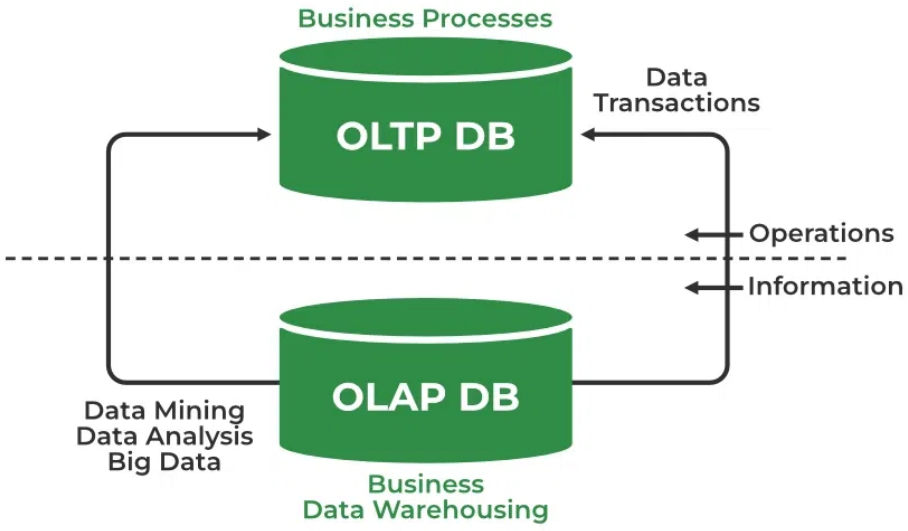
Online Transaction Processing, commonly known as OLTP, is a data processing approach emphasizing real-time execution of transactions. The

majority of OLTP systems are meant to manage numerous short atomic operations that keep databases in line. To maintain transaction integrity and reliability, these systems support ACID (Atomicity, Consistency, Isolation, Durability) properties. It is through this that numerous unavoidable applications run their critical courses like online banking, reservation systems etc.

OLTP Examples

An example considered for OLTP System is ATM Center a person who authenticates first will receive the amount first and the condition is that the amount to be withdrawn must be present in the ATM. The uses of the OLTP System are described below.

- ATM center is an OLTP application.
- OLTP handles the ACID properties during data transactions via the application.
- It's also used for Online banking, Online airline ticket booking, sending a text message, add a book to the shopping cart.



OLTP vs OLAP

Benefits of OLTP Services

- OLTP services allow users to read, write and delete data operations

quickly.
- OLTP services help in increasing users and transactions which helps in real-time access to data.
- OLTP services help to provide better security by applying multiple security features.
- OLTP services help in making better decision making by providing accurate data or current data.
- OLTP Services provide Data Integrity, Consistency, and High Availability to the data.

Drawbacks of OLTP Services

- OLTP has limited analysis capability as they are not capable of intending complex analysis or reporting.
- OLTP has high maintenance costs because of frequent maintenance, backups, and recovery.
- OLTP Services get hampered in the case whenever there is a hardware failure which leads to the failure of online transactions.
- OLTP Services many times experience issues such as duplicate or inconsistent data.

Difference Between OLAP and OLTP

Category	OLAP (Online Analytical Processing)	OLTP (Online Transaction Processing)
Definition	It is well-known as an online database query management system.	It is well-known as an online database modifying system.
Data source	Consists of historical data from various Databases.	Consists of only operational current data.
Method used	It makes use of a data warehouse.	It makes use of a standard database management system

Category	OLAP (Online Analytical Processing)	OLTP (Online Transaction Processing)
		(DBMS).
Application	It is subject-oriented. Used for Data Mining, Analytics, Decisions making, etc.	It is application-oriented. Used for business tasks.
Normalized	In an OLAP database, tables are not normalized.	In an OLTP database, tables are normalized (3NF).
Usage of data	The data is used in planning, problem-solving, and decision-making.	The data is used to perform day-to-day fundamental operations.
Task	It provides a multi-dimensional view of different business tasks.	It reveals a snapshot of present business tasks.
Purpose	It serves the purpose to extract information for analysis and decision-making.	It serves the purpose to Insert, Update, and Delete information from the database.
Volume of data	A large amount of data is stored typically in TB, PB	The size of the data is relatively small as the historical data is archived in MB, and GB.
Queries	Relatively slow as the amount of data involved is large. Queries may take hours.	Very Fast as the queries operate on 5% of the data.
Update	The OLAP database is not often updated. As a result, data integrity is unaffected.	The data integrity constraint must be maintained in an OLTP database.

Category	OLAP (Online Analytical Processing)	OLTP (Online Transaction Processing)
Backup and Recovery	It only needs backup from time to time as compared to OLTP.	The backup and recovery process is maintained rigorously
Processing time	The processing of complex queries can take a lengthy time.	It is comparatively fast in processing because of simple and straightforward queries.
Types of users	This data is generally managed by CEO, MD, and GM.	This data is managed by clerksForex and managers.
Operations	Only read and rarely write operations.	Both read and write operations.
Updates	With lengthy, scheduled batch operations, data is refreshed on a regular basis.	The user initiates data updates, which are brief and quick.
Nature of audience	The process is focused on the customer.	The process is focused on the market.
Database Design	Design with a focus on the subject.	Design that is focused on the application.
Productivity	Improves the efficiency of business analysts.	Enhances the user's productivity.

Conclusion

OLTP (Online Transaction Processing) and OLAP (Online Analytical Processing), are different but supporting roles in data management strategy of an organization. Speedy and accurate transaction handling is what these systems are designed for. Their performance is very crucial in real time

sessions of operation. Conversely, OLAP systems are built to deal with extensive historical data to provide the relevant information for decision-making and strategic planning. Combining the two systems helps organizations to efficiently run their routine activities while at the same time drawing useful intelligence from it.

Difference between OLAP and OLTP in DBMS – FAQs

What is the main difference between OLAP and OLTP?

The main difference lies in their purpose and usage. OLAP is designed for complex data analysis and decision making by processing large volumes of historical data, while OLTP is intended for managing day to day transactions quickly and efficiently.

Can OLAP and OLTP systems be integrated?

Yes, OLAP and OLTP systems can be integrated. Many organizations use OLTP systems to gather operational data and then transfer it to OLAP systems for analytical purposes. This integration ensures that data used for decision making is accurate and timely.

What are some common use cases for OLAP systems?

OLAP systems are commonly used for business intelligence tasks, such as data mining, financial reporting, sales forecasting and customer behavior analysis. Examples include Netflix's recommendation system and Spotify's personalized playlists.

Why are OLTP systems considered fast in terms of query performance?

OLTP systems are fast because they handle small volumes of operational data, typically using normalized databases (3NF), which helps in reducing data redundancy. Queries in OLTP systems are also straightforward and focused on real time transactions.

What are the challenges of maintaining OLAP systems?

Maintaining OLAP systems can be challenging due to the complexity of data modeling, high costs of implementation, and the need for skilled professionals to handle the intricate processes involved in data extraction, transformation and analysis.

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