OLTP vs OLAP: What's the Difference?

What is OLAP?

Online Analytical Processing, a category of software tools which provide analysis of data for business decisions. OLAP systems allow users to analyze database information from multiple database systems at one time.

The primary objective is data analysis and not data processing.

What is OLTP?

Online transaction processing shortly known as OLTP supports transaction-oriented applications in a 3-tier architecture. OLTP administers day to day transaction of an organization.

The primary objective is data processing and not data analysis

Example of OLAP

Any Datawarehouse system is an OLAP system. Uses of OLAP are as follows

- A company might compare their mobile phone sales in September with sales in October, then compare those results with the with another location which may be stored in a sperate database.
- Amazon analyzes purchases by its customers to come up with a personalized homepage with products which likely interest to their customer.

Example of OLTP system

An example of OLTP system is ATM center. Assume that a couple has a joint account with a bank. One day both simultaneously reach different ATM centers at precisely the same time and want to withdraw total amount present in their bank account.

However, the person that completes authentication process first will be able to get money. In this case, OLTP system makes sure that withdrawn amount will be never more than the amount present in the bank. The key to note here is that OLTP systems are optimized for **transactional superiority instead data analysis.**

Other examples of OLTP system are:

- Online banking
- Online airline ticket booking
- Sending a text message
- Order entry
- Add a book to shopping cart

Benefits of using OLAP services

- OLAP creates a single platform for all type of business analytical needs which includes planning, budgeting, forecasting, and analysis.
- The main benefit of OLAP is the consistency of information and calculations.
- Easily apply security restrictions on users and objects to comply with regulations and protect sensitive data.

Benefits of OLTP method

- It administers daily transactions of an organization.
- OLTP widens the customer base of an organization by simplifying individual processes.

Drawbacks of OLAP service

- Implementation and maintenance are dependent on IT professional because the traditional OLAP tools require a complicated modeling procedure.
- OLAP tools need cooperation between people of various departments to be effective which might always be not possible.

Drawbacks of OTLP method

- If OLTP system faces hardware failures, then online transactions get severely affected.
- OLTP systems allow multiple users to access and change the same data at the same time which many times created unprecedented situation.
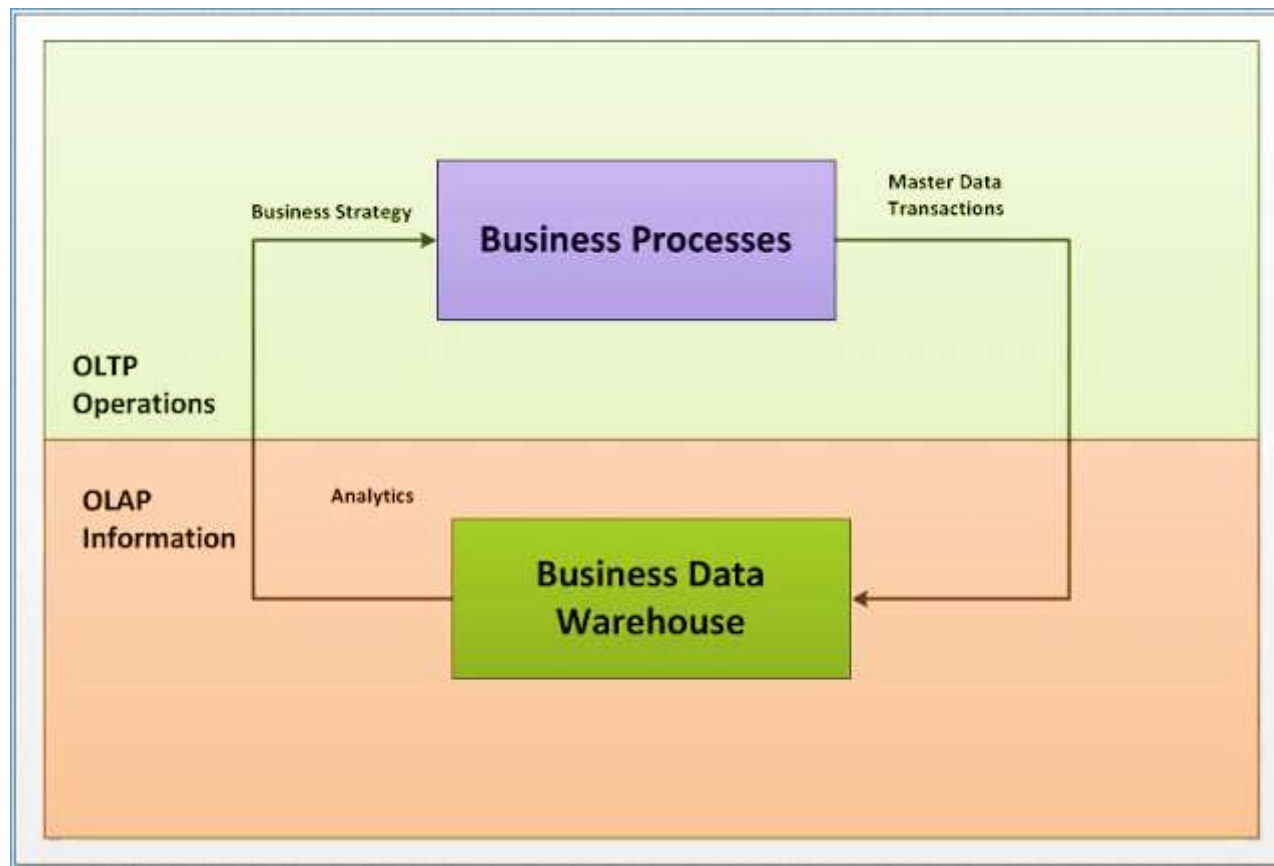
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Difference between OLTP and OLAP

Parameters	OLTP	OLAP
Process	It is an online transactional system. It manages database modification.	OLAP is an online analysis and data retrieving process.
Characteristic	It is characterized by large numbers of short online transactions.	It is characterized by a large volume of data.
Functionality	OLTP is an online database modifying system.	OLAP is an online database query management system.
Method	OLTP uses traditional DBMS.	OLAP uses the data warehouse.
Query	Insert, Update, and Delete information from the database.	Mostly select operations
Table	Tables in OLTP database are normalized.	Tables in OLAP database are **not** normalized.
Source	OLTP and its transactions are the sources of data.	Different OLTP databases become the source of data for OLAP.
Data Integrity	OLTP database must maintain data integrity constraint.	OLAP database does not get frequently modified. Hence, data integrity is not an issue.
Response time	It's response time is in millisecond.	Response time in seconds to minutes.
Data quality	The data in the OLTP database is always detailed and organized.	The data in OLAP process might not be organized.
Usefulness	It helps to control and run fundamental business tasks.	It helps with planning, problem-solving, and decision support.
Operation	Allow read/write operations.	Only read and rarely write.
Audience	It is a market orientated process.	It is a customer orientated process.
Query Type	Queries in this process are standardized and simple.	Complex queries involving aggregations.

Back-up	Complete backup of the data combined with incremental backups.	OLAP only need a backup from time to time. Backup is not important compared to OLTP
Design	DB design is application oriented. Example: Database design changes with industry like Retail, Airline, Banking, etc.	DB design is subject oriented. Example: Database design changes with subjects like sales, marketing, purchasing, etc.
User type	It is used by Data critical users like clerk, DBA & Data Base professionals.	Used by Data knowledge users like workers, managers, and CEO.
Purpose	Designed for real time business operations.	Designed for analysis of business measures by category and attributes.
Performance metric	Transaction throughput is the performance metric	Query throughput is the performance metric.
Number of users	This kind of Database users allows thousands of users.	This kind of Database allows only hundreds of users.
Productivity	It helps to Increase user's self-service and productivity	Help to Increase productivity of the business analysts.
Challenge	Data Warehouses historically have been a development project which may prove costly to build.	An OLAP cube is not an open SQL server data warehouse. Therefore, technical knowledge and experience is essential to manage the OLAP server.
Process	It provides fast result for daily used data.	It ensures that response to the query is quicker consistently.
Characteristic	It is easy to create and maintain.	It lets the user create a view with the help of a spreadsheet.
Style	OLTP is designed to have fast response time, low data redundancy and is normalized.	A data warehouse is created uniquely so that it can integrate different data sources for building a consolidated database

Summary:

- Online Analytical Processing is a category of software tools that analyze of data stored in a database.

- Online transaction processing shortly known as OLTP supports transaction-oriented applications in a 3-tier architecture
- OLAP creates a single platform for all type of business analysis needs which includes planning, budgeting, forecasting, and analysis.
- OLTP is useful to administer day to day transactions of an organization.
- OLAP is characterized by a large volume of data.
- OLTP is characterized by large numbers of short online transactions.
- A data warehouse is created uniquely so that it can integrate different data sources for building a consolidated database.
- An OLAP Cube takes a spreadsheet and three-dimensionless the experiences of analysis.

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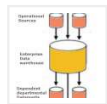
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