



Title: Data Warehouse simulation

Aim: To run Data Warehouse simulation

Resources needed: Different RDBMS such as MySQL, Postgres

Theory

Data Warehouse :

A data warehouse is a type of data management system that is designed to enable and support business intelligence (BI) activities, especially analytics. Data warehouses are solely intended to perform queries and analysis and often contain large amounts of historical data. The data within a data warehouse is usually derived from a wide range of sources such as application log files and transaction applications.

A data warehouse centralizes and consolidates large amounts of data from multiple sources. Its analytical capabilities allow organizations to derive valuable business insights from their data to improve decision-making. Over time, it builds a historical record that can be invaluable to data scientists and business analysts. Because of these capabilities, a data warehouse can be considered an organization's "single source of truth."

ETL :

Extract, Transform, Load (ETL) refers to a process in database usage and especially in data warehousing. Data extraction is where data is extracted from homogeneous or heterogeneous data sources; data transformation where the data is transformed for storing in the proper format or structure for the purposes of querying and analysis; data loading where the data is loaded into the final target database, more specifically, an operational data store, data mart, or data warehouse.

By using an established ETL framework, one may increase one's chances of ending up with better connectivity and scalability. A good ETL tool must be able to communicate with the many different relational databases and read the various file formats used throughout an organization. ETL tools have started to migrate into Enterprise Application Integration, or even Enterprise Service Bus, systems that now cover much more than just the extraction, transformation, and loading of data. A common use case for ETL tools include converting CSV files to formats readable by relational databases. A typical translation of millions of records is facilitated by ETL tools that enable users to input csv-like data feeds/files and import it into a database with as little code as possible. ETL tools in most cases contain a GUI that helps users conveniently transform data, using a visual data mapper, as opposed to writing large programs to parse files and modify data types.

Activities:

For Data Warehouse:

1. Visit <https://www.oracle.com/webfolder/s/assets/demo/adw-quicktour-na/index.html#step1>
2. Go through the demo of Autonomous Data Warehouse for different businesses
3. Prepare a report with following points
 - a. The nature of analytics for different businesses given

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- b. Comparison between traditional analysis and analysis with Data Warehouse
 c. For any two business type given, specify at least two different scenarios where the tool can be useful
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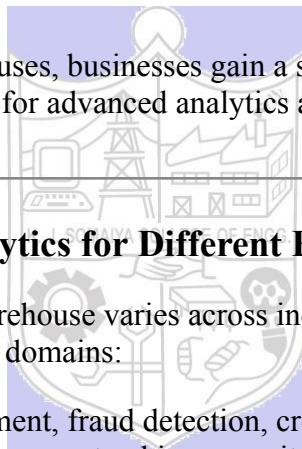
Results:

1. Introduction

A Data Warehouse is a specialized database optimized for analytics and business intelligence. It centralizes and consolidates large volumes of structured and unstructured data from various sources. Unlike transactional databases, which focus on fast insert and update operations, data warehouses are designed to execute complex queries efficiently, enabling businesses to derive meaningful insights.

The ETL (Extract, Transform, Load) process plays a critical role in data warehousing. It involves:

- Extracting data from multiple sources.
- Transforming it into a suitable format.
- Loading it into the data warehouse for analysis.



By leveraging data warehouses, businesses gain a single source of truth for decision-making, allowing for advanced analytics and predictive insights.

2. The Nature of Analytics for Different Businesses

Data analytics in a data warehouse varies across industries. Below are the key focus areas for different business domains:

- Finance: Risk assessment, fraud detection, credit scoring.
 - HR: Employee performance tracking, recruitment analysis, workforce planning.
 - IT: System performance monitoring, cybersecurity threat detection, software quality analysis.
 - Marketing: Customer segmentation, campaign performance tracking, personalization.
 - Sales: Sales forecasting, lead conversion analysis, revenue trend identification.
-

3. Comparison: Traditional vs. Data Warehouse-Based Analysis

Feature	Traditional Analysis	Data Warehouse-based Analysis
Performance	Slower due to real-time transactional processing.	Faster, optimized for analytical queries.

Data Integration	Limited to specific databases.	Merges multiple data sources for unified insights.
Historical Data	Primarily recent transactions.	Large-scale historical data storage.
Scalability	Limited to transactional databases.	Scalable to handle petabytes of data.
Business Intelligence	Requires manual reporting.	Supports AI-powered analytics and visualization.

4. Business Scenarios Where a Data Warehouse is Useful

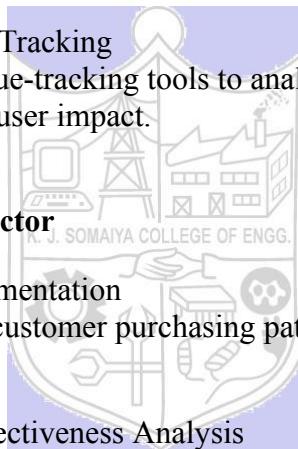
Scenario 1: IT Industry

Use Case 1: Monitoring System Logs

A company collects logs from various servers and applications, analyzing them in a data warehouse to detect potential failures or cyber threats in real-time.

Use Case 2: Software Bug Tracking

Aggregating data from issue-tracking tools to analyze common software bugs, prioritizing fixes based on user impact.



Scenario 2: Marketing Sector

Use Case 1: Customer Segmentation

Marketing teams analyze customer purchasing patterns, segmenting audiences to target personalized offers.

Use Case 2: Campaign Effectiveness Analysis

By integrating data from multiple channels, businesses measure the success of marketing campaigns and optimize strategies accordingly.

5. Results

Upon running the simulation using Oracle's Autonomous Data Warehouse, the following observations were noted:

- Data consolidation allowed seamless integration from multiple sources.
- Query performance improved significantly compared to traditional databases.
- Business intelligence dashboards helped in real-time decision-making.

Analytics the old way

Manually working with multiple spreadsheets with data from various apps.

VS.

Working with visual dashboards that integrate data from multiple sources.

Analytics the new way

Next →

Your tool today is Oracle Autonomous Data Warehouse

Select the line of business that best describes your role

- Finance
- HR
- IT
- Marketing
- Sales

Using Oracle Autonomous Data Warehouse and Oracle Analytics you will complete 3 objectives:

- 1 Set up an Autonomous Data Warehouse
- 2 Scale your warehouse up and down as needed
- 3 Build visualizations for the sales manager

You are now *autonomous*. Let's go!

Start Objective 1 →

Oracle cloud Account Sign In

jane.doe@example.com

Sign In

To begin creating a new autonomous data warehouse, let's log into Oracle Cloud.

→ Click Sign In

Dashboard

Cloud Services

0 notifications

\$1,000 available

Data Integration Platform Cloud Autonomous DW

View Details Open Service Console View Access Usage Details

Next, open the service console.

→ Click Open Service Console

Create Autonomous Data Warehouse

Name: adw_name

Region: US West (Napa)

Storage (TB): 100

Administrator Credentials

Name: adw_name

Password: adw_name

Success—now let's take a quick look and double-check our settings.

→ Click Finance Mart row

Autonomous Data Warehouses in ADW_General Compartment

Name: adw_name

Region: US West (Napa)

Storage (TB): 100

Created: Just now

Compartments: ADW_General

Databases Name: Finance Mart

Databases Count: 1

GPUs Core Count: 4

Storage (TB): 100

Storage Type: Bring Your Own License

Lifecycle State: Available

Finance Mart

DB Connection: Service Console: Update Status: Stop Actions: More

Created: Just now

Compartments: ADW_General

Databases Name: Finance Mart

Databases Count: 1

GPUs Core Count: 4

Storage (TB): 100

Storage Type: Bring Your Own License

Lifecycle State: Available

Backups: Enabled as automatically created daily

Next →

Everything looks good—your Autonomous Data Warehouse is now up and running.

IT

Nice work! Oracle auto-configures your new database with optimal settings, provisioning a high-performance database based on Oracle's Exadata architecture—meaning the system is fully encrypted and secure, with high availability and automatic backups. All in a matter of seconds.

Now let's see how easy it is to scale your new warehouse at will.

Start Objective 2 →

SSB_Analysis - Project

Profit by Product Brand & Regions

Running against 6 billion records, a typical business analyst report (Profit by Brand and Regions) could take 100 seconds with a 4 CPU data warehouse.

But what if that just isn't fast enough for your business? Let's simply and quickly adjust the number of CPUs via a custom call to a REST interface.

Query Time: 100 seconds
Current ADWC CPUs: 4

Now refresh the report to get the updated performance stats.
→ Click Refresh Data

Refresh Data
Refresh Data Sets
Reset Colors
Clear Canvas
Create New Project
Revert to Saved
Debug

Scale ADWC CPUs to:

Query Time: 100 seconds
Current ADWC CPUs: 16

Process time dropped from 100 to just 13 seconds—now that's more like it.

Next →

Query Time: 13 seconds
Current ADWC CPUs: 16

Scale ADWC CPUs to:

Query Time: 13 seconds
Current ADWC CPUs: 16

You can even scale capacity down just as easily to "shut off" CPUs when your data warehouse is not in use.
→ Drag Slider to 0

Scale ADWC CPUs to:

Query Time: 13 seconds
Current ADWC CPUs: 16

Now you're only paying for what you use, and only when you need.

Next →

Query Time: 15 seconds
Current ADWC CPUs: 0

Scale ADWC CPUs to:

Query Time: 15 seconds
Current ADWC CPUs: 0

Objective 2 Complete

Nice work! Just as you're exploring easy scaling, a request for data visualizations comes in from the sales manager. Let's explore how quick and easy it is to build effective visualizations to gather key insights.

Start Objective 3 →

What are you interested in?

The sales manager needs key information about sales by product, profit, and customer segment. From the data visualization home screen, quickly type the queries you're interested in to see visual results.
→ Type in "sales"

Tip: Create a new Data Set by simply dropping your file anywhere on this page

Download Samples
Explore Your Data

Visualize data
Revenue by Product

Find sources of data
Finance Data

Color by Attribute example
Project

Mobile View
p1
p2

The smart search panel automatically suggests query results.
→ Click Sales

Download Samples
Explore Your Data

Sales

Tip: Select Order Lines

Color by Attribute example
Project

Mobile View
p1
p2

8, Let's add "Product Sub Category" to the mix.
→ Click Product Sub Category

Product Name
Customer Lines

Product Container
Sample Order Lines

Product Category
Sample Order Lines

Product Sub Category
Sample Order Lines

8,500,000.00

Visual results are instantly displayed. Let's add a product filter to keep building our picture of all the information the sales manager needs.

Next →

ORACLE Data Visualization

Home

Sales A Product Sub Category

Visualization

Notice how the visualization starts to build based on all search parameters we choose, painting a clearer picture. Let's keep going.

Next →

Sales by Product Sub Category

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ORACLE Data Visualization

Home

Sales A Product Sub Category profit

Visualization

Click the selection to add to our visuals.
→ Click #Profit

Sales by Product Sub Category

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ORACLE Data Visualization

Home

Sales A Product Sub Category Profit

Visualization

Now we're getting some really good stuff.
One last query—let's add customer data.

Next →

Sales, Profit by Product Sub Category

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ORACLE Data Visualization

Home

Sales # of Customers

Visualization

Select "Customer Segment" add it to the mix.
8, → Select Customer Segment

Sales

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ORACLE Data Visualization

Home

Sales # of Customers Customer Segment

Visualization

Looks great!
Now you have a complete view to send over to the sales manager—which can even be sent to any mobile device, perfect for a business traveling scenario.

Finish! →

Sales, Profit by Product Sub Category, Customer Segment

Sales by Product Sub Category

Sales by Product Sub Category, Customer Segm...

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ORACLE Data Visualization

Home

Sales Product Sub Category Profit Customer Segment

Visualization

Finish! →

Sales, Profit by Product Sub Category, Customer Segment

Sales by Product Sub Category

Sales by Product Sub Category, Customer Segm...

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Mission accomplished!

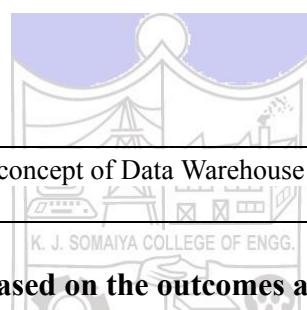
Thanks to the ease of use and power of Oracle Autonomous Data Warehouse you've successfully embraced the power of autonomous with Oracle.

Next step:

This simulator is only the beginning. Uncover the full potential of Oracle Autonomous Data Warehouse by signing up for a free trial.

[Access the free trial →](#)

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Outcomes: CO3: Understanding the concept of Data Warehouse and Data Lake

Conclusion: (Conclusion to be based on the outcomes achieved)

From this experiment, I learned how a data warehouse centralizes and optimizes data for analytical processing, enabling businesses to derive meaningful insights. By running the simulation using Oracle's Autonomous Data Warehouse, I observed how ETL processes integrate data from multiple sources, enhancing performance and scalability. The comparison between traditional analysis and data warehouse-based analysis highlighted the advantages of faster queries, better historical data management, and improved business intelligence. Additionally, analyzing real-world business scenarios demonstrated the practical applications of data warehousing in industries like IT and marketing.

Grade: AA / AB / BB / BC / CC / CD /DD

Signature of faculty in-charge with date

References:

<https://www.oracle.com/in/database/what-is-a-data-warehouse>

- Paulraj Ponniah, "Data Warehousing: Fundamentals for IT Professionals", Wiley India