DATA WAREHOUSING & APPLICATIONS

Name:- Gaurang Ashara

Reg. No:- RA1111027010007

Section:- A1

Department:- DSBS

Assignment:- Kimball's Approach - Red Bull Energy Drink

What is Ralph Kimball's Approach?

The kimball data model follows a bottom-up approach to data warehouse architecture design in which data marts are first formed based on the busines requirments.

Designing a comprehensive business process for Redbull, using Ralphs kimballs Dimensional Modelling, approach, involves considering the key business areas of an company.

The process is breakdown into specific steps, addressing potential challenges during implementation proc

1) **Design Business Objective:-**

→ Clearly outline RedBull's business objectives, such as improving market shares, optimizing distribution, enhancing marketing effectiveness, and ensuring ~~sale~~ as supply chain efficiency.

2) **Identify Key Business Processes:-**

- **Production** - managing the manufacturing of RedBull energy drinks.
- **Distribution** - ensuring efficient delivery to retailers / distributors.
- **Marketing & Sales** - promoting and selling redbull products.
- **Customer Service** - addressing customes inquiries and feedback.

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2) Data Requirement Analysis

- Production - production volumes, raw material usage.
- Distribution - inventory levels, delivery times, distribution channel performance.
- Marketing & Sales - sales data, campaigns and customer demographics.
- Customer Service - feedback, service response time.

4) Dimensional Modelling

a) Fact Tables :- Sales, inventory, production.

b) Dimension Tables :- product, time, location, customer.

5) Data Integration & ETL :- Extract data from production systems, distribution channels, marketing platforms and customer services databases.

Transform and clean data to ensure consistency and quality.

Load data into Data warehouse.

FACT TABLE :-

1) Fact Table :- Production_Fact

→ Production_Key (surrogate key)
→ Product_Key (Foreign key to Product Dimension)
→ Time_Key (Foreign key to Time Dimension)
→ Location_Key (Foreign key to Location Dimension)
→ Production_Volume
→ Production_Time

Dimension Table

→ Product Dimension, Time Dimension, Location & Raw Material Dimen

2) Fact Table :- Distribution_Fact

→ Distribution_Key (surrogate key)
→ Product_Key (Foreign key to Product Dimension)
→ Time_Key (Foreign key to Time Dimension)
→ Location_Key (Foreign key to Location Dimension)
→ Distribution_Quantity
→ Delivery_Times

Dimension Table

→ Product, Time, Location & Distribution Channels Dimension

Fact Table : Sales_Marketing_Fact

→ Sales_Marketing_key (Surrogate key)
→ Product_key (Foreign key to Product Dimension)
→ Time_key (Foreign key to Time Dimension)
→ location_key (Foreign key to location Dimension)
→ Customer_key (Foreign key to Customer Dimension)
→ Sales_Revenue
→ Marketing_Campaign_Performance.

Dimension Tables

Customer, Time, location, ~~Service~~ Marketing Channels Dimension.

Fact Table : Customer_Service_Fact

→ Service_key (Surrogate key)
→ Customer_key (Foreign key to Customer Dimension)
→ Time_key (Foreign key to Time Dimension)
→ location_key (Foreign key to location Dimension)
→ Inquiries
→ Refunds_Time
→ Customer_Feedback

Dimension Tables

Customer, Time, location, Service Channels Dimensions.

Production Fact Table

Production_key	Product_key	Time_key	location_key	Production_Value
1	101	501	801	10000
2	102	502	802	12000

Product Dimension Table

Product_Name	Product_key	Brand	Flavour
Red Bull Original	101	Red Bull	Original
Red Bull Zero	102	Red Bull	Tawiine

Distribution Fact Table

Distribution_key	Product_key	Time_key	location_key	Distribution_qty	Delivery_Time
1	101	501	801	9500	2 days
2	102	502	802	11000	3 days

Marketing & Sales Fact Table

Sale_Marketing_key	Product_key	Time_key	location_key	Customer_key	Sales_Revenue	Marketing_Campaign_Performance
1	101	501	801	1001	50000	High
2	102	502	802	1002	60000	Medium

Customer Service Fact Table

Service_key	Customer_key	Time_key	location_key	Inquiries	Response_Time	Customer_Feedback
1	1001	501	801	20	1 hour	Positive
2	1002	502	802	15	2 hours	Neutral

Addressing Implementation Challenges:

Change Management: Develop a change management plan to address resistance to new processes. Communicate changes effectively and provide training to employees.

Data Governance: Establish data governance policies to maintain data quality and security. Define data ownership and implement data quality checks.

Performance Optimization: Regularly monitor and optimize data warehouse performance. Implement indexing and caching strategies.

Scalability: Design the system to handle growth in data volume and user demands. Consider scalable hardware and cloud based solutions.

Integration with existing systems: Ensure seamless integration with existing systems. Test data flows to prevent disruptions.

Continuous Improvement: Establish a process for ongoing review and improvement of business processes based on performance metrics and feedback.

Monitoring :-

Implement a monitoring system to track data quality, system performance and user adoptions.

Maintenance :-

Schedule a regular maintenance tasks to address issues and optimize the system.

Reporting :-

Develop a reporting tool that leverages the dimensional model to provide actionable insights for decision makers.

(c) Training :-

Provide comprehensive training for employees on new systems and processes.

(d) Support :-

Establish a support system for addressing user issues and concerns.

(e) By following this, Red Bull can address challenges during implementation process.

Advantages of Kimball's Approach:-

It is straightforward and easy to understand.

With a central fact table surrounded by dimension tables, it is intuitive for business users and analysts.

Star schema are easy and they simplify complex queries, it enhances the speed and efficiency of queries.

It supports incremental development.

It encourages definition and enforcement of business rules.

It ensures consistency across data warehouses.

This method simplifies maintenance and reduce errors.

Widely adopted approach for designing and implementing data warehouses.

They allign well with business intelligence tools.