



CST3340 – Business Intelligence

Coursework 1

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## Table of Contents

1. Case Study.....	2
2. Data Source Structure.....	3
3. Data Warehouse.....	4
4. Extraction, Transformation, Loading.....	5
5. OLAP Cubes.....	6
6. Big Data.....	9
7. Cloud Computing.....	12
8. Conclusion & Evaluation.....	13

Organization: Lulu Group International LLC

‘LULU GROUP INTERNATIONAL’, also known as the ‘Lulu Group’, is a highly distinctive company that acts as a lucrative enterprise in key global markets. ‘Lulu Group’ was launched by the well-known businessman 'Yusuff Ali M.A.', where he has grown to become an important economic



driver in the Arabian Peninsula, with a yearly revenue of USD \$ 8 billion. With its global headquarters located in the largest city of the United Arab Emirates, Abu Dhabi, it is a well-known supplier of a diverse global company portfolios that includes commercial property, production and sales of products, supermarket processes, and retail store expansion.

The business process of LULU group involves ‘Retail’, Enterprise Resource Planning which case overseeing variety of day-to-day operations. The lulu group is also involved in other industries such as, Real Estate, Distribution, Manufacturing & processing, Hospitality (Lulu Group International, 2023)

Business intelligence Analytics, involves the methods, technology, procedures, procedures, and software programs that assess the critical business data entrepreneurship better understand its industry and the marketplace, while making accurate, business decisions, have attracted a lot of attention due to the possibilities inherent in 'data and analysis' in various organizations. In summary BI Visualization is a critical factor to consider when applying strategies for the Lulu’s Business Processes (Chen, H., Chiang, R.H.L. and Storey, V.C.2012).

'Business centric techniques and processes' are included in business intelligence and analytics, along with the fundamental data processing and analytical instruments. These techniques can be utilized in a variety of significant applications, including medical care, protection, online purchasing, and market analysis (Chen, H., Chiang, R.H.L. and Storey, V.C.2012). These also include visual results that compare the performance of the business and suggest ways in which other strategies may be used to improve and generate more output or value to the organization.

There are some factors that LULU could improvise upon decision-making.

- Implementation of Business Intelligence Visualization, proving effectiveness of business insights.
- Improving Customer Relationships Management, providing detail analytics.
- Defining their long-term objectives with Enterprise Resource Planning.
- Verifying and authenticating the collection of data that exists within their database.

**Data Structure:**

	<b>Structure Data</b>	<b>Unstructured Data</b>
<b>Internal</b>	<p><i>Customer Database Information</i> – This data consists of the customer’s basic information such as: name, age, contact number, DOB etc.</p> <p><i>Transactions within internal stakeholders</i> – These information record shows the private transaction’s involving shareholders or supplier, or individuals directly being involved within Lulu Group.</p> <p><i>Customer Loyalty Membership</i> – This data structure will consist of information on customers that have signed up for Lulu’s Loyalty Program, constantly gaining rewards as per their membership status.</p> <p><i>Sale Generation Analysis</i> – This data consists of the information that Lulu gathers from the Annual Sales Revenue that it receives Yearly from sales, usually would consist of graphical insights, business analytics,</p> <p><i>Supplier Information</i> – This will consist of all the information of the suppliers, and their transactions with Lulu, the goods and products that are being traded &amp; sold. Typically, would include Supplier name, company, goods sold, amount in USD.</p>	<p><i>Customer Reviews</i> – Customers directly leaving a review on the website can see the issues or performance data by gathering scores on low or high rated reviews to give a better insight into product quality.</p> <p><i>Company Advertisement Boards</i> – Lulu Hypermarkets would have sign boards showing information on promotion, miscellaneous posters, and other wanted information.</p>
<b>External</b>	<p><i>Public Statistics</i> – Economic Times and other platforms may share the performance of the Lulu group, showing insights into their market share for a certain product. This will therefore give an idea to other competitor SMEs that are willing to enter the new market.</p> <p><i>Market Value</i> – CB Insights may publish their data on the active Net Income of Lulu Group International, moreover they can research other existing information from the CEO’s Net Value.</p> <p><i>Market Trends</i> – gathering Analysis of Lulu’s capabilities in setting up a price competition for a product and aiming for more on profitable strategic investments &amp; objectives.</p>	<p><i>Government Data</i> – The government may publish a secondary data source of Lulu Group containing all their annual income statements and their balance sheets made publicly.</p> <p><i>Social Media</i> – social media that are operated by Lulu promoted all kinds of products and promotions that are sold which are being handled by their marketing team.</p>

Fig. 1

## - Data Warehouse Schema:

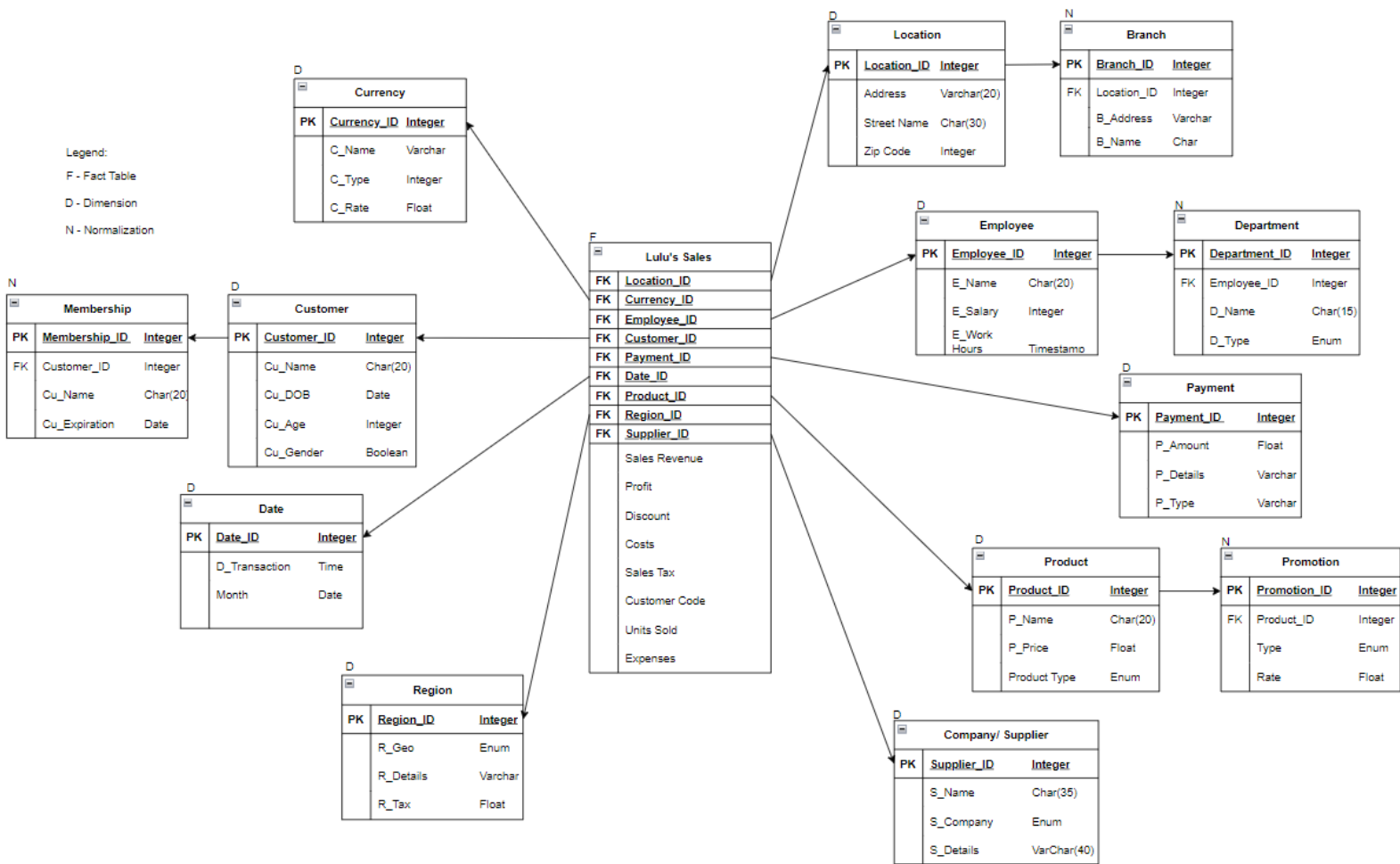


Fig. 2

### Granularity:

In an identical way, a 'software system' that offers remarkably smooth adjustments lets you select extremely particular parameters for campaign setup, etc. This might be used, for instance, to specify the exact conditions under which a computerized promotional email is sent. Alternatively, in the case of promotions, the exact requirements for starting a particular campaign. Offering you more control over your data is the primary advantage of 'audience segmentation' and 'granular data'. Their potential benefits are multiplied when different headless microservices are connected to one another. Your chances of achieving goals increase with the number of options for altering information that you contain (Talon.One, 2023).

### ETL Process on Lulu's Data Warehouse:

Java Script Object Notation is used for gathering data from social media. Extraction is the process where the META Data is extracted from a source location to a staging area. This ranges from Structured and Unstructured Data Sources, in this case the Lulu Group's Data Management Lead extracts these raw data, that use SQL Servers, Customer Relation Management, or Enterprise Resource Planning Software (Amazon Web Services, 2023)

Transformation is the stage to which the META Data extraction is processed and is applied to an analysis use-case. This stage ensures that all the data extracted is cleansed, validated, filtered, and authenticated. In addition, it ensures that the Raw Data are in structured labels, to be summarized confirming the schema of the location data warehouse (Amazon Web Services, 2023).

The Loading stage is where the Data is moved from the staging area on to its specific location data warehouse and further the stage is analysis in the collection of the Raw Data.

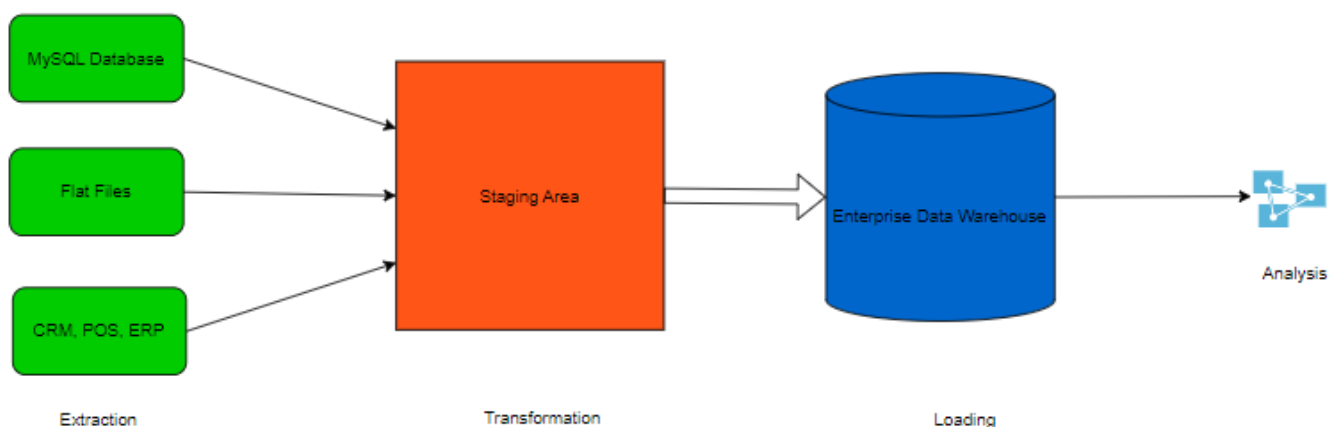


Fig. 3

## OLAP

'OLAP Cube' is a data structure that enables quick evaluation of information in accordance with the several features that characterize in optimizing lulu's business challenges for a better performance. For example, a multifunctional cube with seven dimensions for business transaction could contain the following: retailer, sales quantity, location, goods, period, and year. An OLAP Cube is essentially a 'two-dimensional' set of data that is capable of being considered as a modified version of the conventional model structure that a spreadsheet provides, which holds data in the 'form of columns and rows'. Although the amount of 'arrays of values', or 'Dimensions', that a Cube can hold is limitless, OLAP Cube designers strive to create structures that achieve an equilibrium between user requirements and theoretical constraints (Olap.com, 2018).

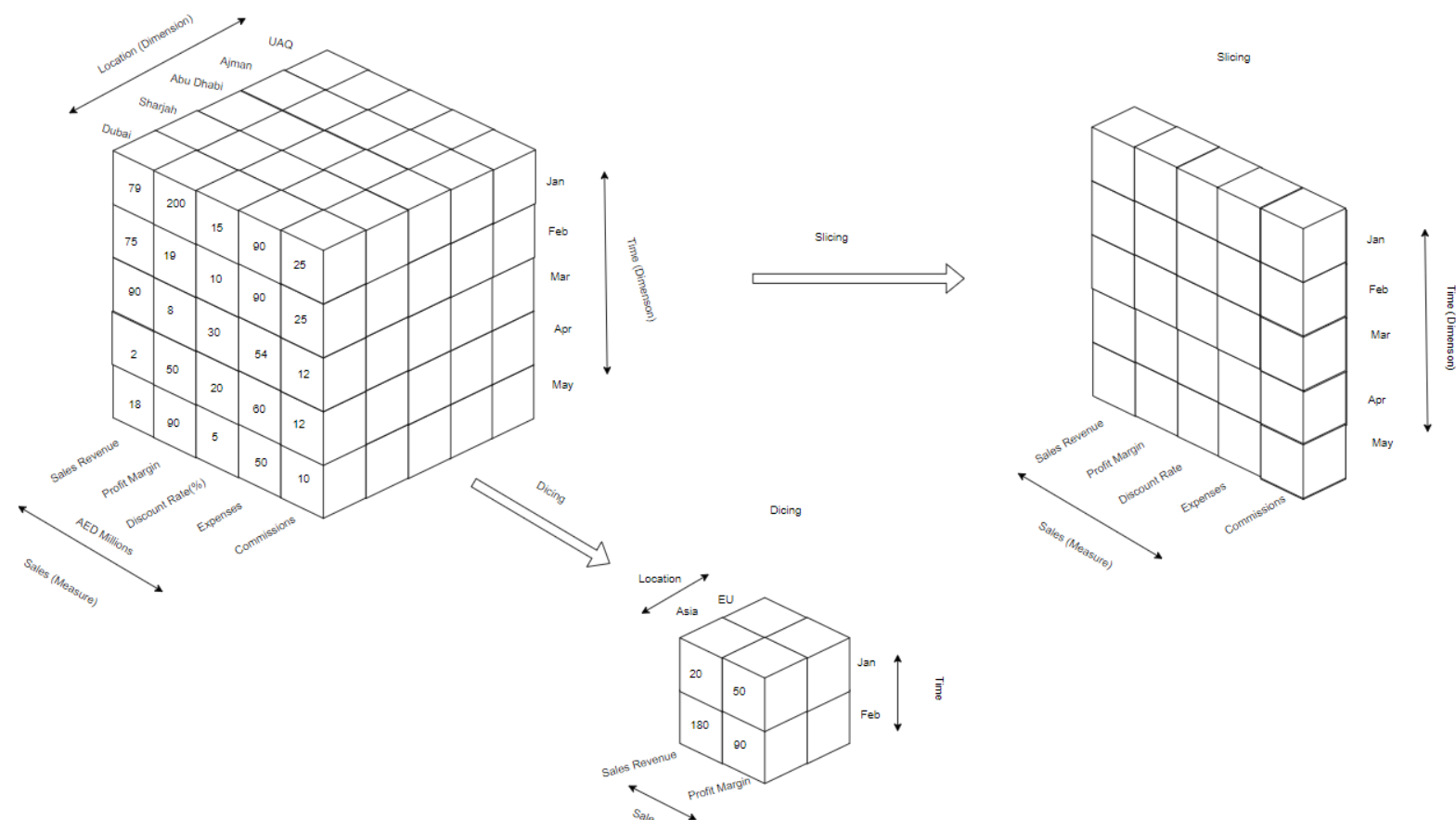


Fig. 4

Slicing represents two-dimensional view of the OLAP cubes, therefore giving more visualisation for lulu group to have an insight and proper evaluation of the information that is achieved. E.g., shown in Fig. 4

Dicing emphasizes two more additional dimensions for the cubes suggesting new sub-cubes. E.g., shown in Fig. 4

Pivoting concept provides a new viewpoint on the data that resides inside the Slicing of a multilayer OLAP Cube. Alternatively put, this might be for a specific time frame, version, or kind of spending. Reorienting a cube can efficiently present information with period throughout the screen and expense items below on the screen. This reorientation requires retrieving a substantial amount of data (OLAP.COM, n.d.) e.g., shown in Fig. 5:

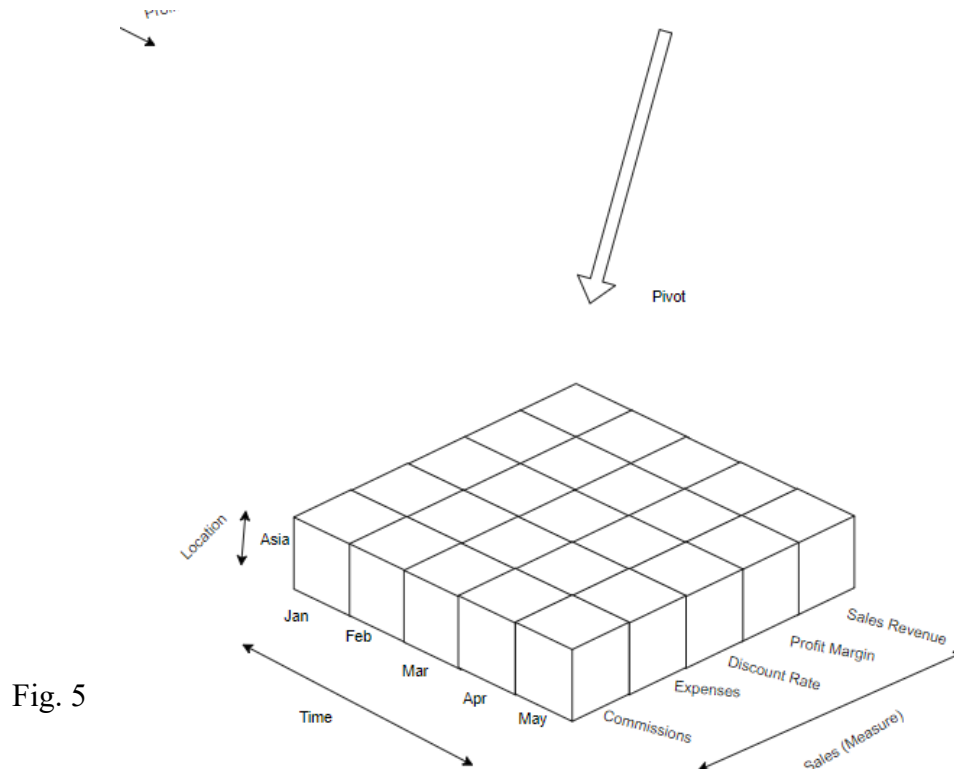


Fig. 5

Roll-up is described as a summarization of the gathered data, to whichever raw data is purged, the maximum and the minimum and averages values are generated and stored in different ways as shown in Fig. 6:

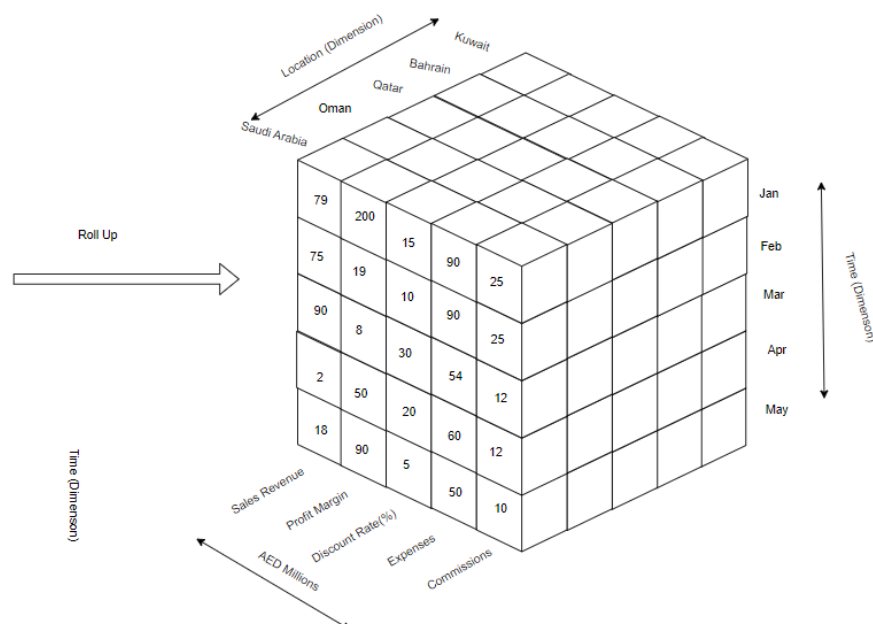


Fig. 6



The drill down is the opposite of drill-up, showing either by descending a concept hierarchy for a dimension or by adding a new dimension shown in fig. 7:

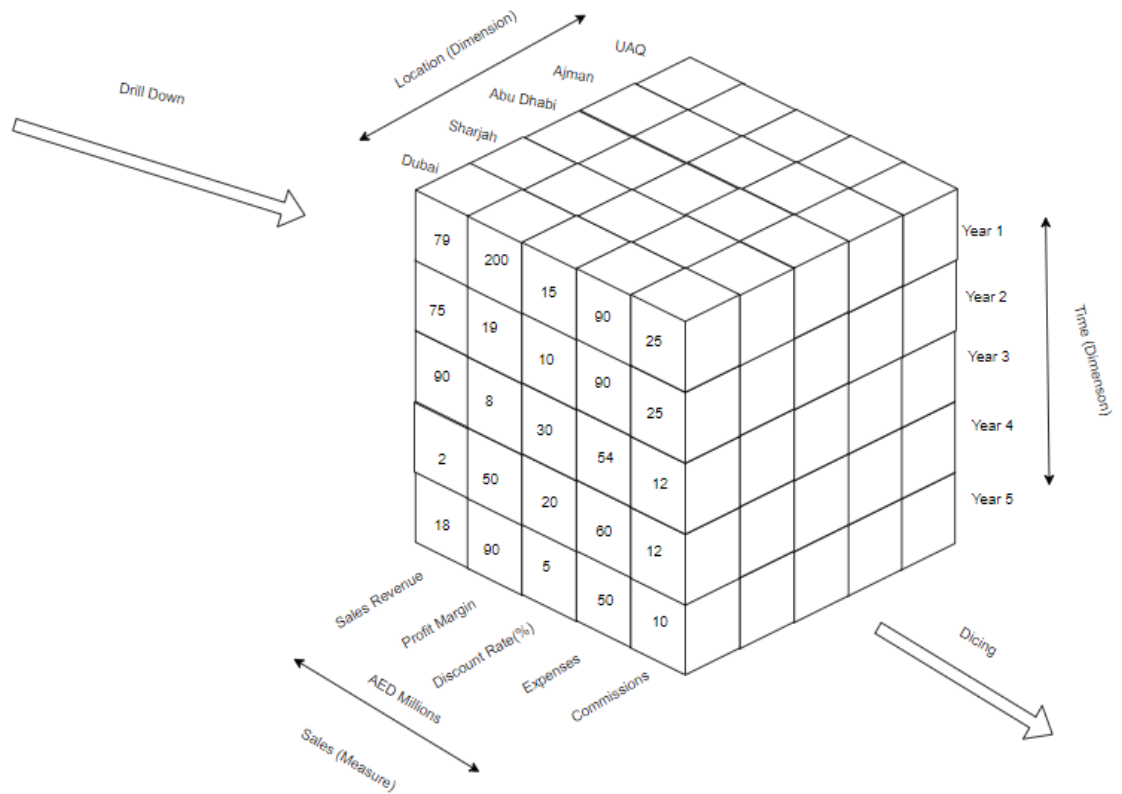


Fig. 7

## Big Data

The chosen framework for this case study is Spark, in LuLu's case big data workloads are processed using 'Apache Spark', 'an open-source distributed computation engine. It improves 'query execution' and 'in-memory caching' to provide quick analytical queries over any quantity of dataset. It facilitates code recycling across many workloads, including batch computation, queries with interaction, real-time data analysis, machine learning, and diagram processing. It offers developer 'API Tools in Java, Scala, Python, and R'. To overcome the inefficiencies of Hadoop's MapReduce, Spark was developed to handle content in-memory, minimize the variety of processes in an operation, and reuse data across several simultaneously activities. Spark allows for substantially more rapid processing by reading data into memory, executing operations, and receiving reports with detailed results (Amazon, 2009).

Is a data collection containing large amounts of data, which are very high-volume, complicated to manage with both data structure in forms structured and unstructured that helps the business on daily basis. It is so complex that it's challenging or almost impossible to access the volume of data using traditional methods. Big Data can be utilized in Lulu Group to obtain informative insights and advise decision-making processes. It's ability to analyze enormous quantities of data from multiple sources while gaining an expanded awareness of consumers, business operations, and market conditions by applying modern analytical methods and instruments.

The concept gained popularity in the early 2000's when Doug Laney's articulated definitive of big data as the Five V's (Framework, B.D., 2019):

### **The Five V's Velocity, Variety, Volume, Veracity, Value:**

Velocity data describes the speed within how fast the data is generated, e.g., How fast Lulu is able to process transactional data in selling items (Framework, B.D., 2019).

Variety refers to all the data that are collected by Lulu Group which are either Structured, Semi-Structured and Unstructured Data, in addition it is also segregated into two parts with data being Internal and External (Framework, B.D., 2019).

Volume describes the size of the dataset that Lulu will require, for the data to be processed and its usually larger to even count (Petabytes). It also requires different processing techniques rather than the use of traditional storing and other processing requirements (Framework, B.D., 2019).

Variability, Data flows are more unanticipated, transforming frequently and exhibiting wide variations in addition to the raising 'velocities and varieties' of data. Although it can be

difficult for lulu group as they must be aware of social media trends and understand how to handle peak data loads that are triggered by events, seasons, and daily activity (Framework, B.D. 2019).

Veracity explains the precision of the data quality, Data collection from different sources makes it challenging to connect, create relation, and clean the data transformation between systems. Lulu Group must connect and create correspondence within multiple data links, hierarchical collection, and relationships; therefore, their data may become unmanageable without executing connection and data links.

Advantages of Big Data for Lulu Group (Ellis, N. 2023):

1. It identifies the root cause of business failures, challenges, and abnormalities that lulu is facing in a fraction of real-time analysis.
2. It oversees the anomalies efficiently and more precisely than rather than traditional methods.
3. The big data would provide lulu with essential information to enhance the decision-strategy, by analyzing the insights, market trends and correlation within the hypermarket business data.
4. It improves Risk Management by analyzing the data from external and internal sources, effectively minimizing, and anticipating the dangerous outcomes.
5. Enhanced customer service, CRM would be a prime example in managing customer relations, so along with big data it aims to improvise the quality of customer management and service and predicting the behavioral patterns of the consumer.
6. Innovative Technological Management promotes creativity within Lulu's Business Management Team to create business solutions.

Disadvantages of Big Data for Lulu Group (Ellis, N. 2023):

1. Security and Privacy challenges pose a threat to Lulu's consumers as they receive such sensitive data, therefore must ensure that they are solely responsible for safeguarding and handling such information.
2. Ethical Data Processing is committed to giving consent to Lulu's consumer in processing their data for analysis. This could become an extensive issue especially if Lulu violates data access and security.
3. GDPR Compliance (Europe Union), as per EU law Lulu must comply with GDPR especially since they've expanded operations in Poland, while extensively carrying out more research to explore European markets which would again be a challenge for them to process a vast amount of data.
4. High Maintenance Costs, the implementation of big data would be very expensive for lulu, and maintain the type of infrastructure, specialized workers, and the technology it needs. This would likely be a risky investment if its business objectives are not achieved.

### **Cloud Computing:**

In this case study the best solution for Lulu's Cloud Computing is PaaS as a solution, as in this case study of lulu's objectives should be to strategize on 'cost efficiency', PaaS provides a low operating cost and maintenance, ensuring that lulu could invest on other efforts such as enhancing collaboration between development teams, improving the security of data and proper data recovery minimizing the data loss. PaaS would offer a simplified process of development and deployment of applications, so they could focus more on creating features without compromising the underlying infrastructure.

Furthermore, the concept of 'cloud computing' allows lulu for flexible, effortless, and instantaneous access to a common set of reconfigurable computing resources. In instance these include the networks, storage systems, mobile applications, and assistance can be quickly provided and released with little involvement from service providers or management. Virtualization is the foundation of cloud computing technology. 'Hypervisor virtualization of servers' and 'application virtualization' are the two fundamental kinds of virtualization. The types of cloud computing include Public, Private and Hybrid Cloud, with each sector providing a different management level and security protocols. Through utilization of virtualization, numerous individuals can access an application stored on one computer (Ruparelia, N.B. 2016).

There are three types of Cloud Computing Services (Oracle 2020):

- Software as a service (SaaS) this service allows user to operate the application over the internet.
- Platform as a service (PaaS) similarly PaaS also allows users to operate the application In Addition to being granted the developer's tools and permissions to maintain the application via Internet.
- Infrastructure as a service (IaaS) allows the user to edit the infrastructure services as a 'on-demand basis', so the cloud accommodates the infrastructure component requirements, providing storage and network capacity to run in the cloud.

In this business case, Lulu's cloud computing enables them to save more costs from traditional methods of processing data, even being able to maintain the data in real-time. It offers the flexibility to be able to access data anytime and anywhere.

### **Conclusion & Findings of an appropriate data strategy:**

In conclusion, it shows that with big data involved in business process, Lulu can maintain costs, achieve business objectives and initiatives. This involves the guidelines of their current data structure and the ways that it's improved and optimized. Data Analysis should be considered as a part of the plan in processing data within Lulu, creating audits against existing data warehouse, and verification of data in compliance with process.

If Lulu needs to become more adaptable to emerging markets, I think they should consider improving their online shopping experience by ease-use of their smartphone application and retail websites. The addition of having a better relationship with the consumers will positively impact on the spending and keeping them up-to date with discounts and other promotional initiatives.

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