IST722: Class Exercise 2

This is an individual assignment.

Before you begin, please make sure you've read and understand 1) our class honor code, 2) course policies on late work and 3) participation policies as posted on the syllabus. "I didn't know" is not an excuse.

You should cite your sources in a standard format like MPA or APA and include a list of works cited.

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Instructions (Refer Unit 2)

Answer each of the following questions as concisely as possible. More is not necessarily better. Please justify your answer by citing your sources from the assigned readings from our textbooks, our class lectures, or online if directed to do so. Be sure to cite in text and include a list of works cited. Place your answer below each question. When you're finished, print out this document and bring it to class as part of your participation grade.

Questions

[1] What is DW Technical Architecture? Give examples.

Ans - Data warehouse architecture, also known as Data Flow Architecture, is the framework and building blocks of a modern data warehouse. It focuses on the movement of data from one ERP (Enterprise Resource Planning) system to another. Example of Technical Architecture is the flow of information from an ERP system by an ETL process to a data warehouse in an organization.

[2] What is DW System Architecture? Give examples.

Ans – DW system architecture consists of the physical configuration of systems and networks which are required to support the technical architecture. System architecture is the arrangement of hardware and software components to support the technical requirements of an organization. For example, the configuration of servers and networks in an organization that stores customer information. There are 3 types of architecture namely one tier, two tier and three tier.

[3] What are the 4 types of data stores found in technical architectures?

Ans – In data warehouse technical architectures, data stores play a crucial role in storing and managing data. Here are the four types of data stores commonly found:
User-Facing: Accessible to end-users for querying data via applications.
Internal: Used exclusively by the data warehouse and not accessible to end-users.
Hybrid: Combines user-facing and internal features for query and staging purposes.
External: External repositories not directly integrated into the data warehouse.

[4] Describe the 5 technical architectures discussed throughout the coursework. Be brief.

Ans – The five technical architectures are:

1. **Centralized Architecture**: In this approach, data is stored in a single, centralized data warehouse, providing a unified view for consistency and governance. It suits organizations with simpler data requirements and emphasizes integration and standardization.
2. **Independent Data Marts**: Separate data repositories focus on specific business areas, granting flexibility and autonomy to departments. It is ideal when different units have distinct data requirements and desire independent control.
3. **Enterprise Bus Architecture**: Combining a central data warehouse with departmental data marts, this architecture offers a balance between central control and departmental autonomy.
4. **Hub and Spoke Architecture**: The central data warehouse acts as the integration point, while independent data marts or satellite systems serve specific needs. It provides autonomy while allowing the sharing of common data.
5. **Federated with ETL Architecture**: This architecture integrates data from multiple sources on-the-fly using virtual integration and real-time ETL processes. It is suitable for organizations with diverse data sources that require on-demand access and integration.5. Federated with ETL Architecture: Integrates data on-the-fly from multiple sources using virtual integration and real-time ETL processes. Useful when diverse data sources require on-demand access and integration.

[5] Discuss the comparative success of the 5 technical architectures. Be brief.

Ans - The effectiveness and success of a data warehouse architecture depend on various factors, including the organization's specific needs, data requirements, scalability, and available resources. However, in terms of complexity, the most complex is the Federated with ETL architecture and the least complex is the Centralized architecture.

1. Centralized Architecture: Successful for organizations with simpler data needs and a focus on integration and standardization.
2. Independent Data Marts: Achieve success when different units have distinct data requirements and seek autonomy.
3. Enterprise Bus Architecture: Balances central control and departmental flexibility, relying on robust data governance and collaboration.
4. Hub and Spoke Architecture: Proves successful when autonomy is desired alongside some shared data, necessitating integration efforts.
5. Federated with ETL Architecture: Succeeds for organizations with diverse data sources requiring on-demand integration.

The success of a data warehouse architecture depends on various factors such as data complexity, scalability, performance requirements, data governance needs, and the organization's goals. It is recommended to carefully evaluate these factors and choose an architecture that aligns with the specific requirements and priorities of your organization.

WORKS CITED:

[1] What is Data Warehouse Architecture? (n.d.). Snowflake. https://www.snowflake.com/guides/data-warehouse-architecture

[2] Video lectures on Introduction to Data Warehousing by Prof. Michael Fudge and Class Discussions with Prof. Humayu Khan