

Architecture Design **Amazon Sales Data Analysis**

Revision Number: 1.0 Last
Date of revision: 23/4/2023

Deevanshi Sharma

Document Version Control

Date Issued	Version	Description	Author
19 th April 2023	1.0	First Version	Deevanshi Sharma

Contents

1. Introduction	4
1.1 What is Architecture design document?	4
1.2 Scope	4
2. Architecture of Tableau	5
1. Data Server	5
2. Data Connector.....	6
3. Components of Tableau server	6
4. Gateways	7
5. Clients view	7
3. Tableau Service	7

1. Introduction

1.1 What is Architecture design document?

It is a document that provides a comprehensive description of the software architecture of a system. It defines the high-level design decisions, choices, and trade-offs made during the development of a software system, and serves as a reference for developers, stakeholders, and other members of the project team. Each style will describe a system category that consists of:

- A set of components (e.g.: a database, computational modules) that will perform a function required by the system.
- The set of connectors will help in coordination, communication, and cooperation between the components.
- Conditions that how components can be integrated to form the system.
- Semantic models that help the designer to understand the overall properties of the system.

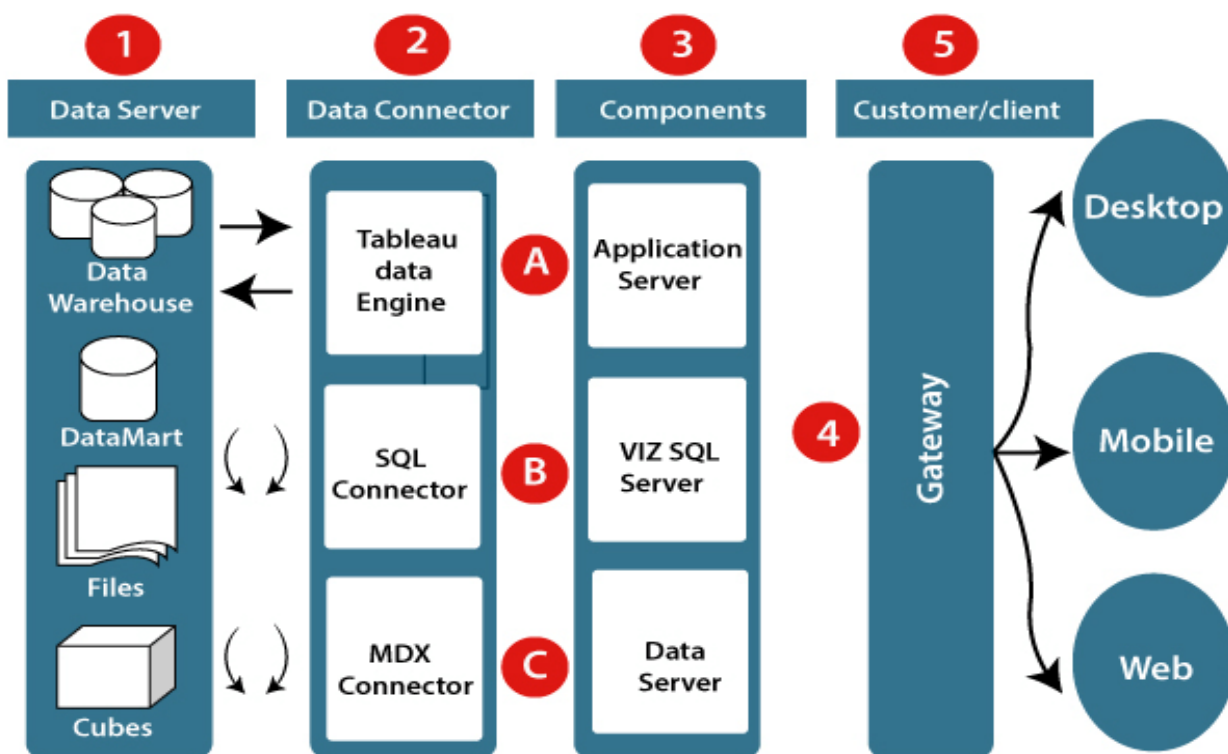
1.2 Scope

Architecture Design Document is an architecture design process that follows a step-by-step refinement process. The process can be used for designing data structures, required software architecture, source code and ultimately, performance algorithms. Overall, the design principles may be defined during requirement analysis and then refined during architectural design work

2. Architecture of Tableau

Tableau is a powerful data visualization and business intelligence software tool that allows users to easily connect, visualize, and share data in interactive and engaging ways. Some of the popular Tableau software tools are:

1. Tableau Desktop: This is the main authoring and publishing tool of Tableau that allows users to create interactive dashboards, reports, and charts using a drag-and-drop interface.
2. Tableau Prep: This is a data preparation tool that enables users to clean, shape, and combine their data before visualizing it in Tableau Desktop.
3. Tableau Server: This is a web-based platform that allows users to publish and share their Tableau dashboards and reports with others within their organization.
4. Tableau Online: This is a cloud-based version of Tableau Server that enables users to access and share their Tableau content from anywhere with an internet connection.
5. Tableau Public: This is a free, public-facing platform that allows users to publish and share their Tableau visualizations with the world.
6. Tableau Mobile: This is a mobile app that allows users to view and interact with Tableau dashboards and reports on their mobile devices.



1. Data server

The primary component of Tableau Architecture is the Data sources which can connect to it.

Tableau can connect with multiple data sources. It can blend the data from various data sources. It can connect to an **excel file**, **database**, and a **web application** at the same time. It can also make the relationship between different types of data sources.

2. Data connector

The Data Connectors provide an interface to connect external data sources with the Tableau Data Server.

Tableau has in-built SQL/ODBC connector. This ODBC Connector can relate to any databases without using their native connector. Tableau desktop has an option to select both extract and live data. On the uses basis, one can be easily switched between live and extracted data.

- **Real-time data or live connection:** Tableau can relate to real data by linking to the external database directly. It uses the infrastructure existing database by sending dynamic **multidimensional expressions (MDX)** and SQL statements. This feature can be used as a linking between the live data and Tableau rather than importing the data. It makes optimized and a fast database system. Mostly in other enterprises, the size of the database is large, and it is updated periodically. In these cases, Tableau works as a front-end visualization tool by connecting with the live data.
- **Extracted or in-memory data:** Tableau is an option to extract the data from external data sources. We make a local copy in the form of Tableau extract file. It can remove millions of records in the Tableau data engine with a single click. Tableau's data engine uses storage such as **ROM, RAM, and cache** memory to process and store data. Using filters, Tableau can extract a few records from a large dataset. This improves performance, especially when we are working on massive datasets. Extracted data allows the users to visualize the data offline, without connecting to the data source.

3. Components of Tableau server

Different types of components of the Tableau server are:

- Application server
- VizQL server
- Data server

A. Application server

The application server is used to provide the authorizations and authentications. It handles the permission and administration for mobile and web interfaces. It gives a guarantee of security by recording each session id on Tableau Server. The administrator is configuring the default timeout of the session in the server.

B. VizQL server

VizQL server is used to convert the queries from the data source into visualizations. Once the client request is forwarded to the VizQL process, it sends the query directly to the data source retrieves information in the form of images. This visualization or image is presented for the users. Tableau server creates a cache of visualization to reduce the load time. The cache can be shared between many users who have permission to view the visualization.

C. Data server

Data server is used to store and manage the data from external data sources. It is a central data management system. It provides **data security, metadata management, data connection, driver requirements**, and data storage. It stores the related details of data set like **calculated fields, metadata, groups, sets**, and **parameters**. The data source can extract the data as well as make live connections with external data sources.

4. Gateway

The gateway directed the requests from users to Tableau components. When the client sends a request, it is forwarded to the external load balancer for processing. The gateway works as a distributor of processes to different components. In case of absence of external load balancer, the gateway also works as a load balancer. For single server configuration, one gateway or primary server manages all the processes. For multiple server configurations, one physical system works as a primary server, and others are used as worker servers. Only one machine is used as a primary server in Tableau Server environment.

5. Clients

The visualizations and dashboards in Tableau server can be edited and viewed using different clients. Clients are a web browser, mobile applications, and Tableau Desktop.

- **Web Browser:** Web browsers like **Google Chrome, Safari**, and **Firefox** support the Tableau server. The visualization and contents in the dashboard can be edited by using these web browser.
- **Mobile Application:** The dashboard from the server can be interactively visualized using mobile application and browser. It is used to edit and view the contents in the workbook.
- **Tableau Desktop:** Tableau desktop is a business analytics tool. It is used to **view, create**, and **publish** the dashboard in Tableau server. Users can access the various data source and build visualization in Tableau desktop.

3. Tableau Service

Tableau offers a range of services that help businesses and organizations to analyze, visualize, and share data. Here are some details on the different Tableau services:

1. **Data Connection and Integration:** Tableau has a wide range of data connectors that allow users to connect to data sources such as spreadsheets, databases, cloud services, and many more. Tableau also has the capability to blend data from multiple sources, which means users can combine data from different sources to get a more comprehensive view of their data.
2. **Data Preparation:** Tableau Prep is a data preparation tool that enables users to clean, reshape, and combine their data before analyzing it in Tableau Desktop. Tableau Prep also provides features for data profiling, cleansing, and enrichment, which makes it easier for users to prepare their data for analysis.
3. **Data Visualization:** Tableau Desktop is a powerful data visualization tool that allows users to create interactive and visually appealing dashboards, charts, maps, and reports. It has a drag-and-drop interface that makes it easy for users to create insightful visualizations. Tableau Desktop also provides various chart types and customization options, which means users can create visualizations that are tailored to their specific needs.

4. **Collaboration and Sharing:** Tableau provides several platforms that enable users to share their data visualizations, dashboards, and reports with others. Tableau Server is an on-premise platform that allows users to share their visualizations within their organization. Tableau Online is a cloud-based platform that enables users to share their visualizations with others via the web. Tableau Public is a free platform that allows users to share their visualizations with the public.
5. **Analytics and Insights:** Tableau provides several features for advanced analytics, including statistical analysis, forecasting, and trend analysis. It also supports machine learning and artificial intelligence for deeper insights and predictions. Tableau also provides the capability to create calculated fields and use parameters, which makes it easier for users to perform complex analysis.
6. **Mobility:** Tableau provides mobile apps for iOS and Android, which allow users to access and interact with their data visualizations and reports on-the-go. The mobile apps have similar features as the Tableau Desktop, which means users can create, view, and interact with their data visualizations on their mobile devices.