Architecture
Amazon Sales Data Analysis

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1. Introduction

1.1 What is Architecture design document?

Any software needs the architectural design to represents the design of software. IEEE defines architectural design as "the process of defining a collection of hardware and software components and their interfaces to establish the framework for the development of a computer system." The software that is built for computer-based systems can exhibit one of these many architectures.
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 (ADD) 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

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2. Architecture of Tableau

Tableau has a highly scalable, n-tier client-server architecture that serves mobile clients, web clients, and desktop-installed software.

Tableau Desktop is the authoring and publishing tool that is used to create shared views on Tableau Server.

Tableau Server is an enterprise-class business analytics platform to level up thousands of clients. Tableau Server presents powerful mobile- and browser-based analytics and workings among a company's presented data strategy and security protocols.

Tableau Server Architecture

The following diagram shows Tableau Server's architecture:
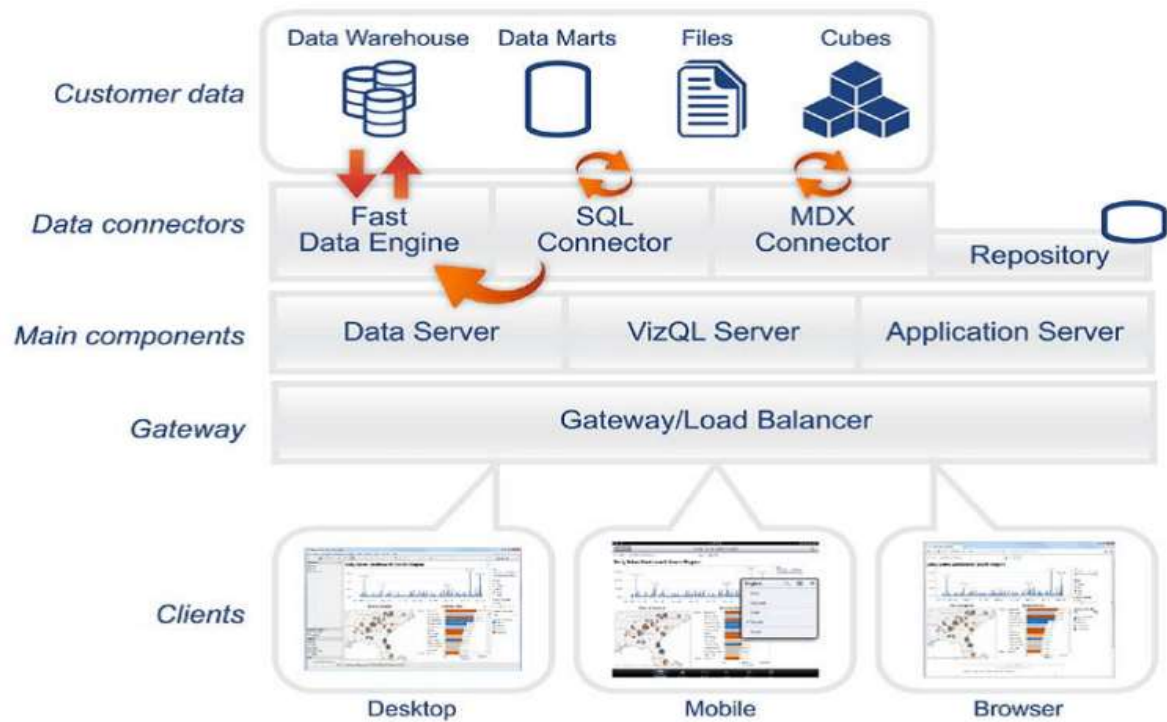
Data Layer

One of the basic characteristics of Tableau is to support your choice of data architecture. Tableau does not need your data to be stocked in any single system, proprietary or otherwise. Nearly all companies have a heterogeneous data environment, data warehouses live alongside databases and data cubes and flat files, such as Excel, are still very much in use. You do not have to get the entire data in memory until you choose to do so. If your existing data platforms are fast and scalable, then Tableau permits you to directly control your investment by utilizing the power of the database to respond to problems. If this is not the case, then Tableau provides simple options to improve your data to be fast and responsive with your fast in-memory data engine.

Data Connectors

It consists of a number of optimized data connectors for databases. There are also common open database connectivity (ODBC) connectors designed for any system without a native connector. Tableau offers two modes in support of interacting with data—live connection or in-memory. Clients can switch between alive and in-memory connections as they desire.

Live Connection

The data connectors of Tableau control your available data infrastructure by transferring dynamic SQL or MDX statements directly to the source database, except for importing all data. If you have provided a quick and analytics-optimized database, such as Vertica, then you will get the advantages of that investment by connecting live to your data. This leaves the detailed data in the source system and sends the aggregate outcomes of the query to Tableau. In addition, this means that Tableau can effectively utilize unlimited amounts of data—in fact, Tableau is the front-end analytics client to several of the largest databases in the world. Tableau optimizes every connector to receive the advantage of the unique characteristics of every data source.

Tableau Server Components

Now, let us take a look at the components of Tableau Server in this section:

- **Application Server:** The application server handles login processes, permission management, authentications, and authorizations.
- **VizQL Server:** The VizQL server is utilized to turn the data source's queries into visuals.
- **Data Server:** The data server facilitates metadata administration, driver deployment, and extract management by centralizing them.
- **Backgrounder:** The backgrounder controls background processes and refreshes scheduled extracts.
- **Gateway or Load Balancer:** A gateway is a type of web server that allows clients to connect with the components of Tableau Server by routing their requests over HTTP.
- **Clients (Web Browsers and Mobile Apps):** Mobile browsers and applications may be used to interactively see the server dashboards. Tableau Server is supported by web browsers such as Google Chrome, Safari, Firefox, and Internet Explorer.
- **Clients (Tableau Desktop):** Tableau Desktop is a business analytics solution that allows users to access a variety of data sources and create visuals.

Advantages of Tableau Server

- Scales up: Is multi-threaded
- Scales out: Is multi-process enabled
- Provides integrated clustering
- Supports high availability
- Is secure
- Runs on both physical and virtual machines

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Summary

Let's take a quick overview of what we have learnt in this Tableau architecture tutorial. Firstly, we learned what exactly is the architecture of Tableau. Tableau Server's architecture is designed with a purpose of securely linking various data sources. Then, we discussed various layers in the architecture of Tableau such as Data layer, data connectors, live connection and In-memory. Also, we have gone through its various components such as application server, VizQL server, data server, backgrounder, gateway or load balancer, Clients (Web Browsers and Mobile Apps, Clients (Tableau Desktop). Along with this, we talked about a bunch of advantages about this Tableau Architecture.