# Architecture Design

## Ecommerce Sales Dashboard

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# DOCUMENT CONTROL

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## Contents

# 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 :

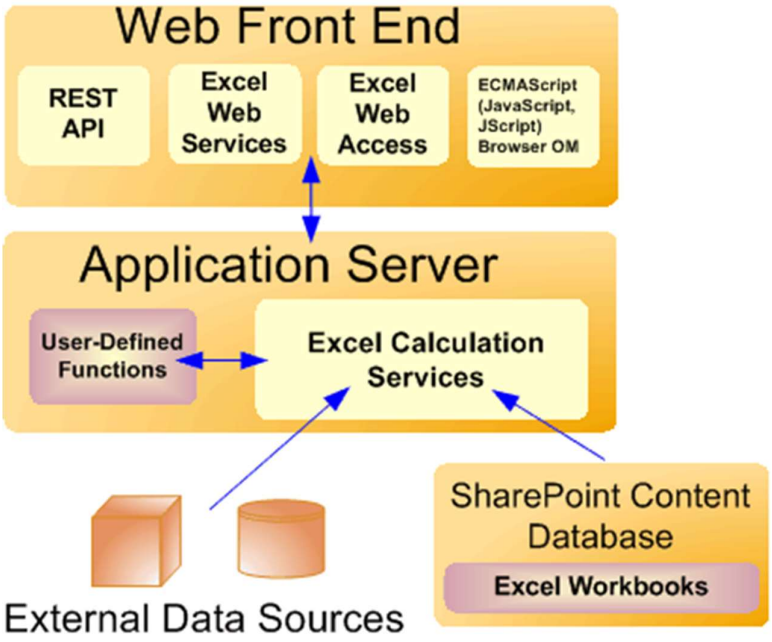
- A set of components (eg: a database, computational modules) that will perform a function required by the system.
- The set of connectors will help in coordination, communication, and cooperation between the components.
- Conditions that how components can be integrated to form the system.
- Semantic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

## 2. Architecture

**EXCEL**




### 1. Web front-end servers and back-end application servers

The Excel Web Access, Excel Web Services, UDFs, JavaScript, the REST service, and Excel Calculation Services components can be divided into components on the Web front-end server and components that live on a back-end application server. The Web front end includes Excel Web Access, JavaScript, the REST service, and Excel Web Services. The Excel Calculation Services component resides on the back-end application server, alongside any UDF assemblies that an administrator has added.

### 2. Excel web access

Excel Web Access is a viewer page and an Excel Services web part that you can add to any web parts page in SharePoint Server 2010. Excel Web Access renders (in other words, creates the HTML for) live Excel workbooks on a webpage, and enables the user to interact with those workbooks and explore them. Excel Web Access is the visible Excel Services component for the user.

### 3. Excel web services

Excel Web Services is the Excel Services component that provides programmatic access to its Web service. You can develop applications that call Excel Web Services to calculate, set, and extract values from workbooks, and to refresh external data connections. By using Excel Web Services, you can

incorporate server-side workbook logic into an application, automate the updating of Excel workbooks, and create application-specific user interfaces around server-side Excel calculation.

## 4. User-defined functions (UDFs)

Excel Services UDFs enable you to use formulas in a cell to call custom functions that are written in managed code and deployed to SharePoint Server 2010.

## 5. ECMAScript (JavaScript, JScript)

The JavaScript object model in Excel Services enables developers to customize, automate, and drive the Excel Web Access web part control on a page. By using the JavaScript object model, you can build mashups and other integrated solutions that interact with one or more Excel Web Access web part controls on a page or an **iframe** with script on the page. It also enables you to add more capabilities to your workbooks and code around them.

## 6. REST API

The REST API in Excel Services enables you to access workbook parts or elements directly through a URL. The URL contains a "marker" path, which is the entry point to an .aspx page, to the workbook file location, and to the path to the requested element inside the workbook.

The discovery mechanisms built into the Excel Services REST API enables developers and users to explore the content of a workbook manually or programmatically.

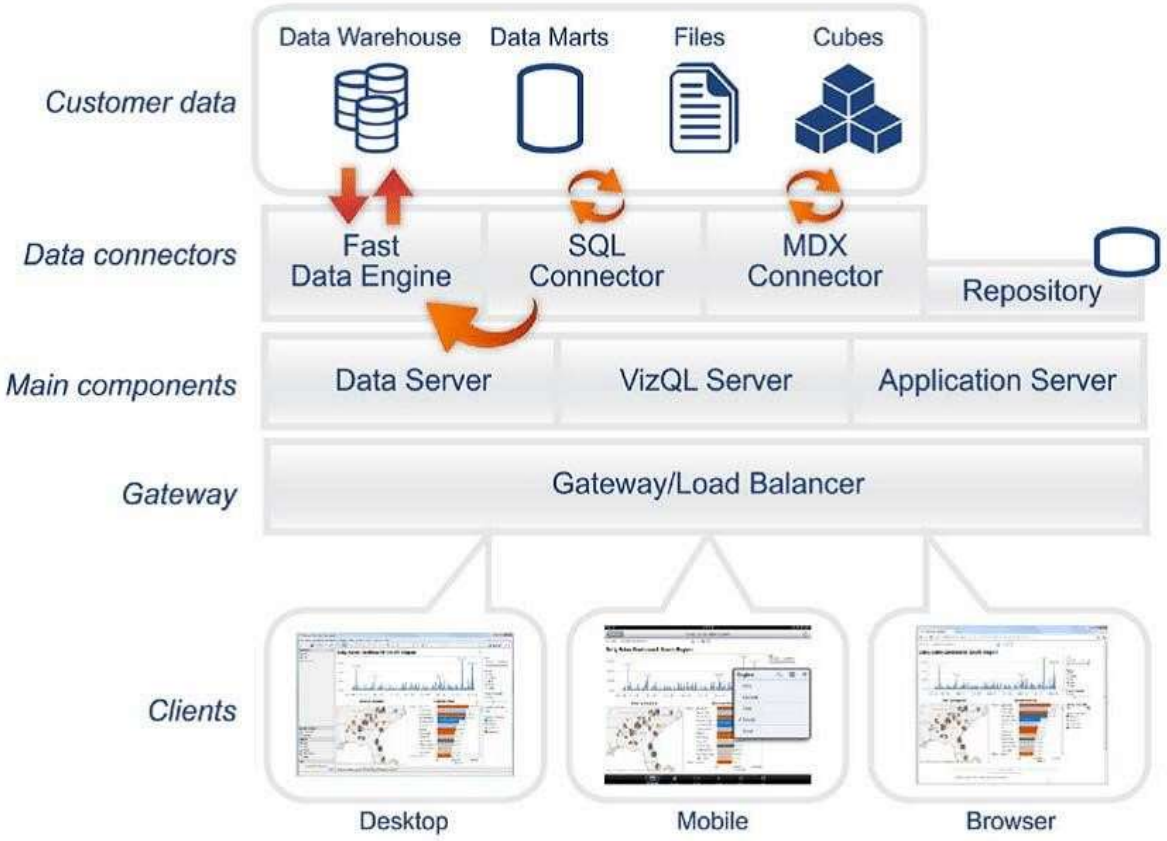
## 7. Excel calculation services

The role of Excel Calculation Services is to load workbooks, calculate workbooks, call custom code (UDFs), and refresh external data. It also maintains the session state for interactivity. Excel Calculation Services maintains a session for the duration of interactions with the same workbook by a user or caller. A session is closed when the caller explicitly closes it or when the session times out on the server. Excel Services caches the opened Excel workbooks, calculation states, and external data query results, for improved performance when multiple users access the same set of workbooks.

## 8. Load-Balancing

In multiple-server configurations, Excel Services load-balances requests across multiple Excel Calculation Services occurrences in a farm configuration. If your installation includes multiple application servers, Excel Services will balance the load in an attempt to help ensure that no single application server is overloaded by requests.Administrators can configure the load-balancing behaviour.

# TABLEAU




## Tableau Server Architecture

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

The following diagram shows Tableau Server's architecture:

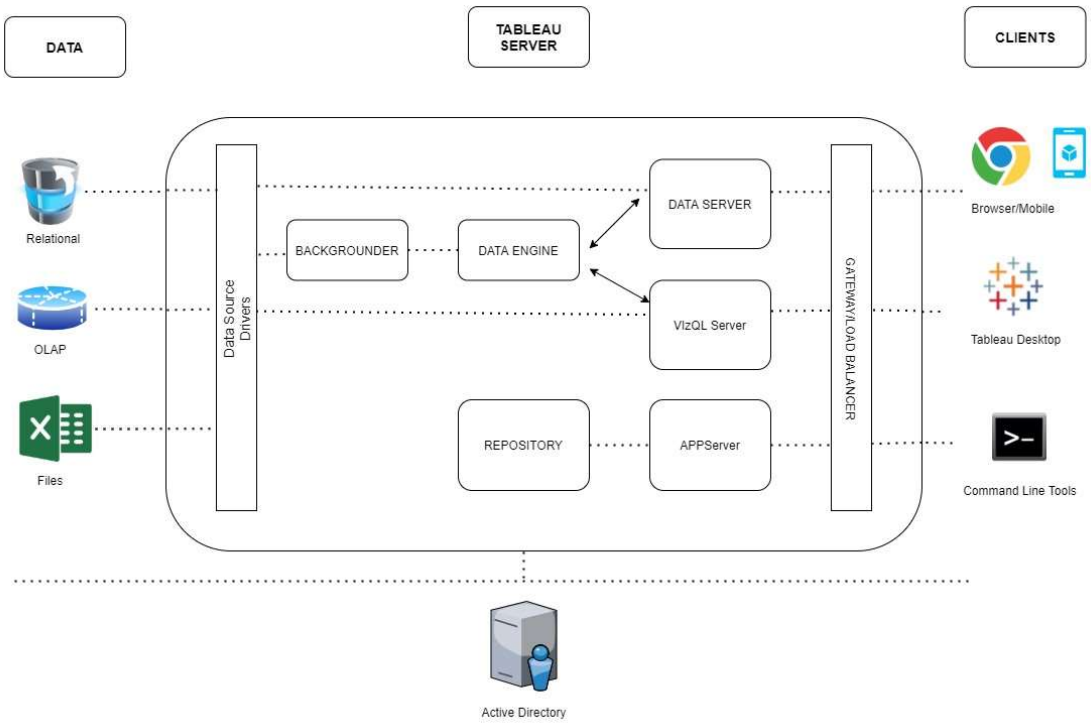



Tableau Server is internally managed by the multiple server processes.

## 1. Gateway/Load Balancer

It acts as an Entry gate to the Tableau Server and also balances the load to the Server if multiple Processes are configured.

## 2) Application Server:-

Application Server processes (wgserver.exe) handle browsing and permissions for the Tableau Server web and mobile interfaces. When a user opens a view in a client device, that user starts a session on Tableau Server. This means that an Application Server thread starts and checks the permissions for that user and that view.

### 3) Repository:-

Tableau Server Repository is a PostgreSQL database that stores server data. This data includes information about Tableau Server users, groups and group assignments, permissions, projects, data sources, and extract metadata and refresh information.

### 4) VIZQL Server:-

Once a view is opened, the client sends a request to the VizQL process (vizqlserver.exe). The VizQL process then sends queries directly to the data source, returning a result set that is rendered as images and presented to the user. Each VizQL Server has its own cache that can be shared across multiple users

### 5) Data Engine:-

It Stores data  extracts and answers queries.

### 6) Backgrounder:-

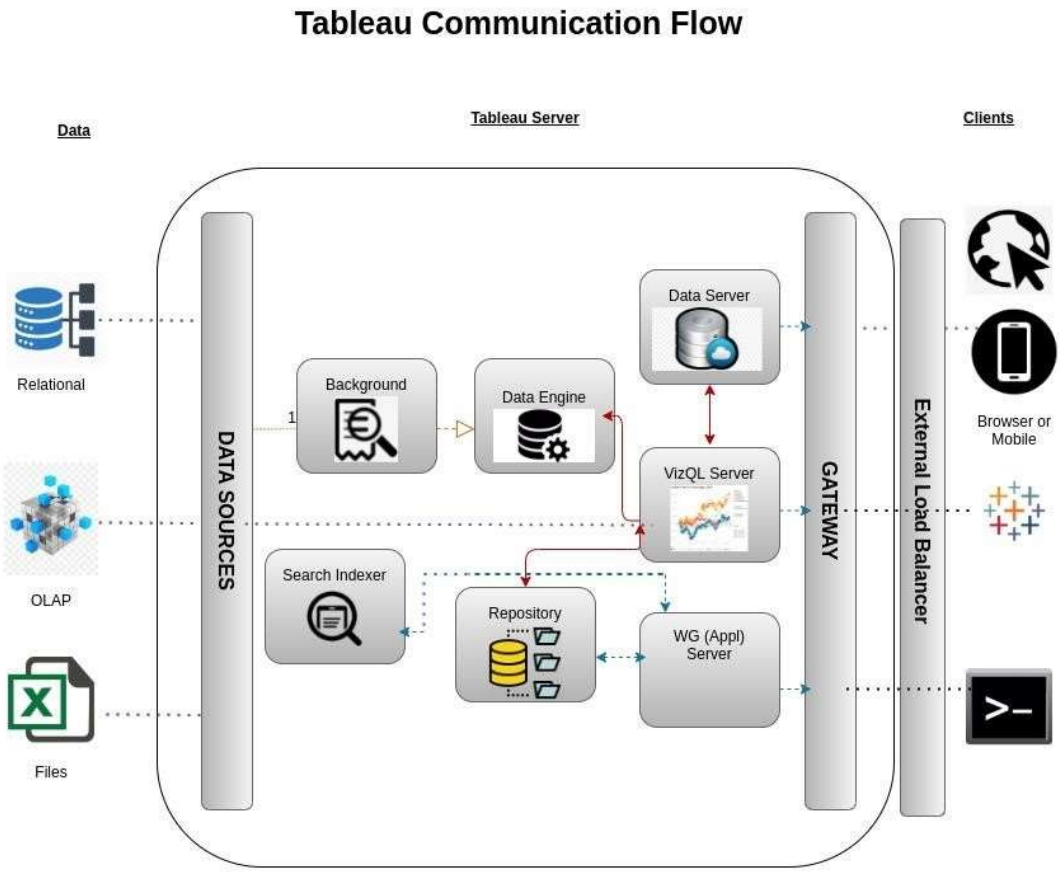
The backgrounder Executes server tasks which includes refreshes scheduled extracts, tasks initiated from tabcmd and manages other background tasks.

### 7) Data Server:-

Data Server Manages connections to Tableau Server data sources

It also maintains metadata from Tableau Desktop, such as calculations, definitions, and groups.

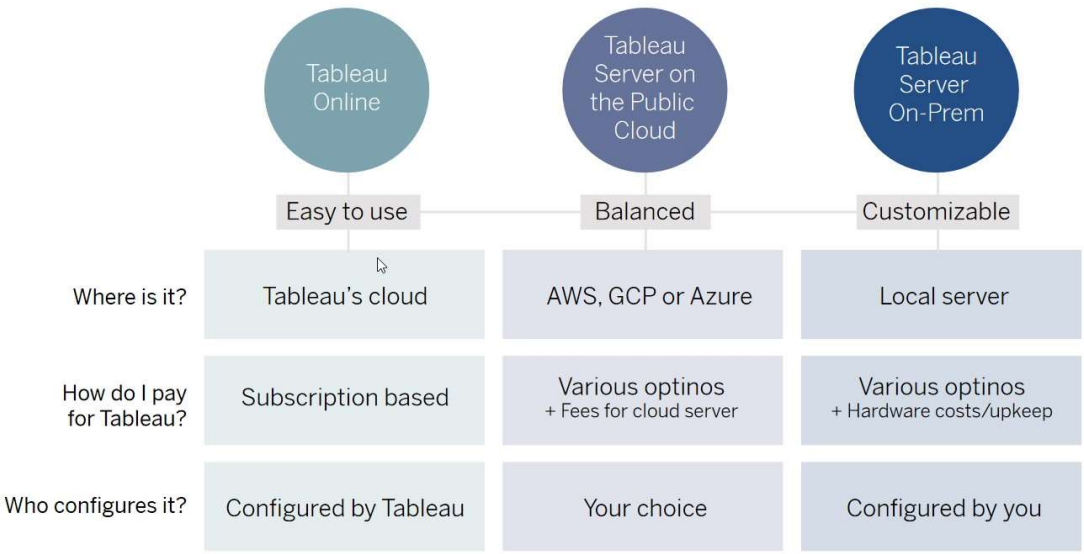
## 8) Tableau Communication Flow



# 3. Deployment Description

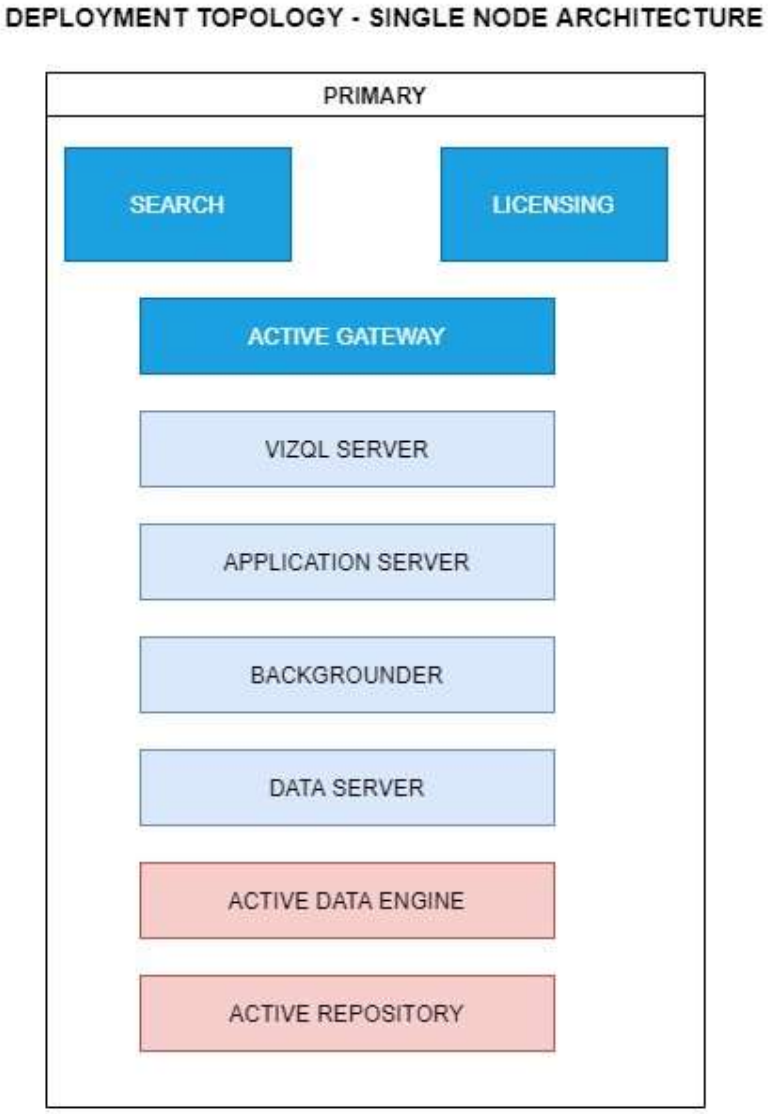
## 3.1 Deployment options in Tableau

Tableau's analytics platform offers three different deployment options depending on your environment and needs. The below graphic shows each option at a glance:



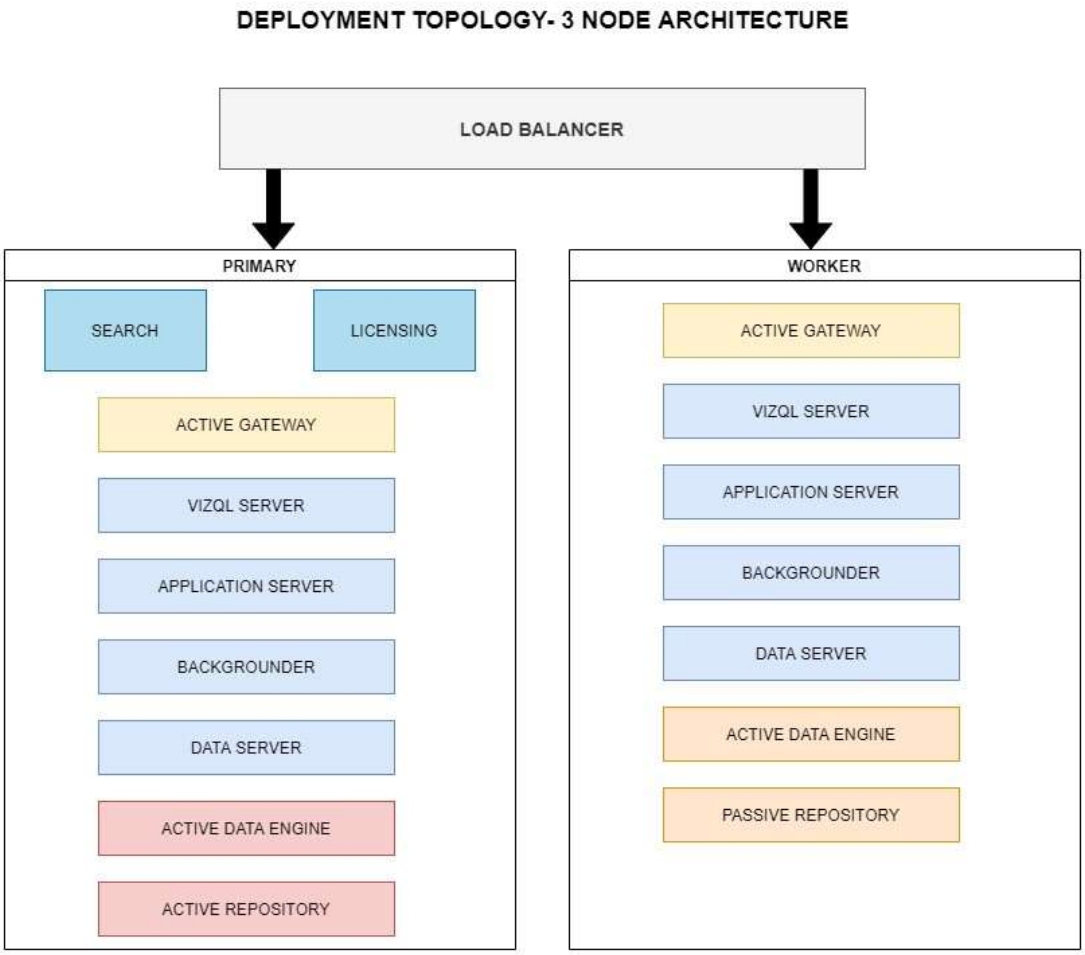

1. **Tableau Online** Get up and running quickly with no hardware required. Tableau Online is fully hosted by Tableau so all upgrades and maintenance are automatically managed for you.
2. **Tableau Server** deployed on public cloud: Leverage the flexibility and scalability of cloud infrastructure without giving up control. Deploy to Amazon Web Services, Google Cloud Platform, or Microsoft Azure infrastructure to quickly get started with Tableau Server (on your choice of Windows or Linux). Bring your own license or purchase on your preferred marketplace.
3. **Tableau Server deployed on-premises**: Manage and scale your own hardware and software (whether Windows or Linux) as needed. Customize your deployment as you see fit.

## 3.2 Single Node Architecture




This architecture is a single node architecture. This is the most simple deployment topology.

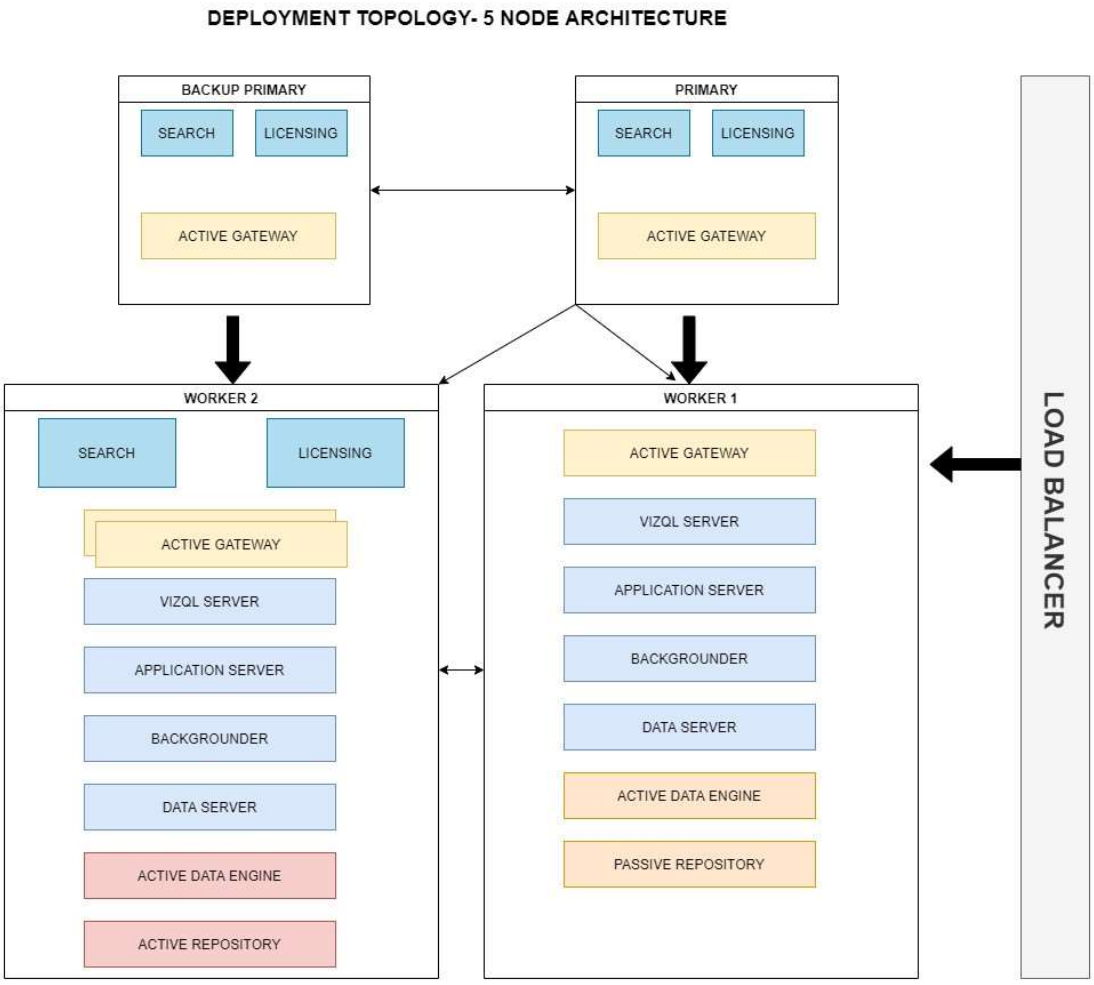
## 3.3) 3 Node Architecture




This architecture is a 3 Node Architecture which is more capable to handle concurrent requests.

If we need failover or high availability, or want a second instance of the repository, we must install Tableau Server on a cluster of at least three computers. In a cluster that includes at least three nodes, you can configure two instances of the repository, which gives our cluster failover capability.

## 3.4) 5 Node Architecture




When we install Tableau Server on a Five-node cluster, we can install server processes on one or both nodes. A five-node cluster can improve the performance of Tableau Server, because the work is spread across multiple machines.

Note the following about five-node clusters:

- A five-node cluster does not provide failover or support for high availability.
- You can't install more than one instance of the repository on a two-node cluster, and the repository must be on the initial node.