

# Low Level Design

## NBA DATA ANALYSIS

<b>Written By</b>	Nandini Verma
<b>Document Version</b>	0.1
<b>Last Revised Date</b>	20-07-2024

## DOCUMENT CONTROL

### Change Record:

VERSION	DATE	AUTHOR	COMMENTS
0.1	20 july 2024	Nandini verma	Introduction and architecture defined
0.2	20 july 2024	Nandini Verma	Architecture & Architecture description appended and updated.

### Reviews:

VERSION	DATE	REVIEWER	COMMENTS
0.2	20 july 2024	Nandini verma	Unit test cases to be added

### Approval Status:

VERSION	REVIEW DATE	REVIEWED BY		APPROVED BY	COMMENTS

## Contents

<b>1.</b>	<b>Introduction.....</b>	<b>04</b>
<b>1.1</b>	<b>What is Low-Level Design Document? .....</b>	<b>04</b>
<b>1.2</b>	<b>Scope .....</b>	<b>04</b>
<b>2.</b>	<b>Architecture .....</b>	<b>05</b>
<b>3.</b>	<b>Architecture Description .....</b>	<b>08</b>
<b>3.1</b>	<b>Data Description .....</b>	<b>08</b>
<b>3.2</b>	<b>Web Scrapping .....</b>	<b>08</b>
<b>3.3</b>	<b>Data Transformation .....</b>	<b>08</b>
<b>3.4</b>	<b>Data insertion into database .....</b>	<b>08</b>
<b>3.5</b>	<b>Connection with SQL server .....</b>	<b>08</b>
<b>3.5</b>	<b>Export Data from database .....</b>	<b>12</b>
<b>3.6</b>	<b>Deployment .....</b>	<b>12</b>
<b>4.</b>	<b>Unit test cases .....</b>	<b>15</b>

## 1. Introduction

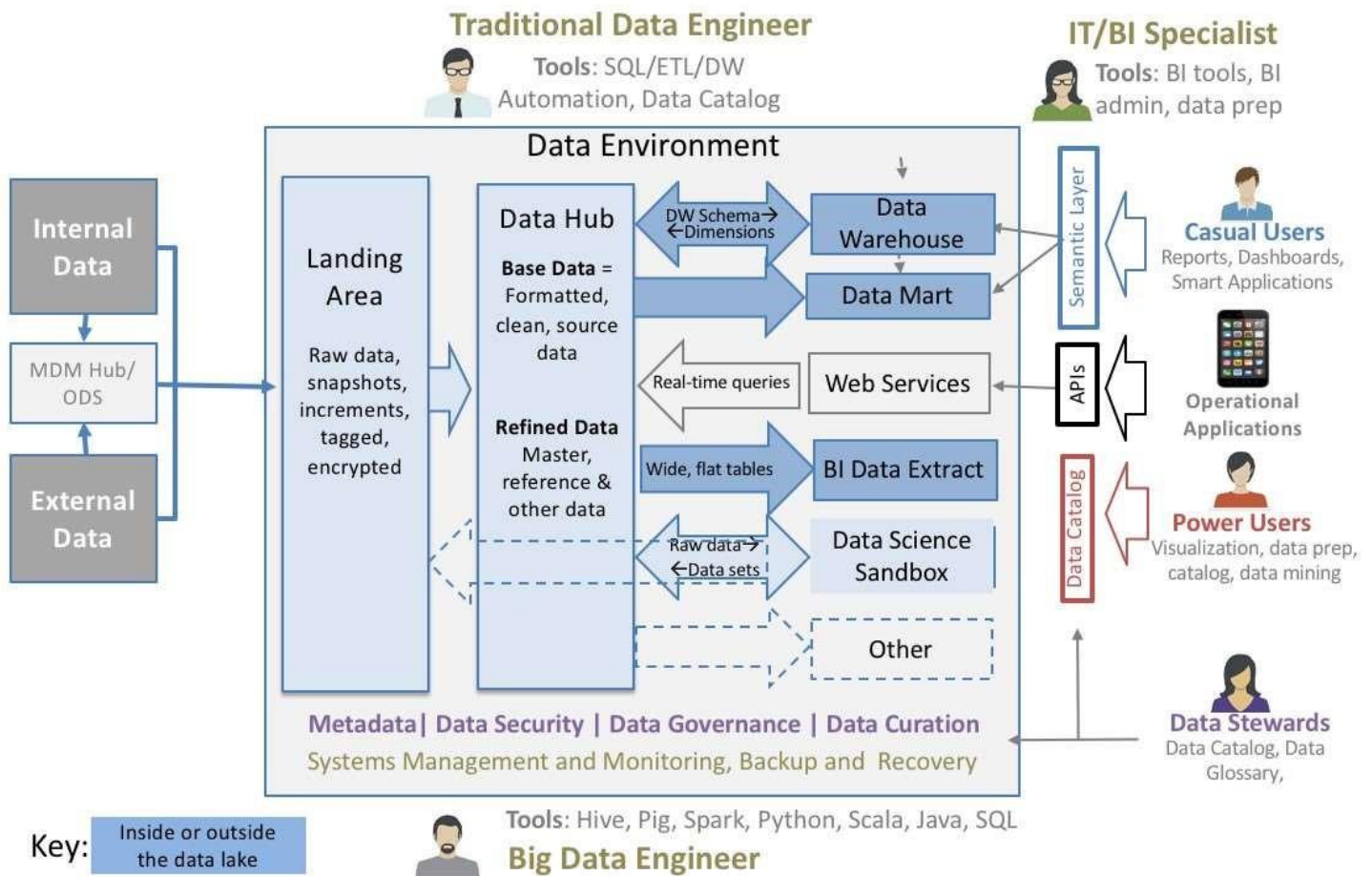
### 1.1 What is Low-Level design document?

The goal of the LDD or Low-level design document (LLDD) is to give the internal logic design of the actual program code for the NBA Data Analysis dashboard. LDD describes the class diagrams with the methods and relations between classes and programs specs. It describes the modules so that the programmer can directly code the program from the document.

### 1.2 Scope

Low-level design (LLD) is a component-level 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 data organisation may be defined during requirement analysis and then refined during data design work.

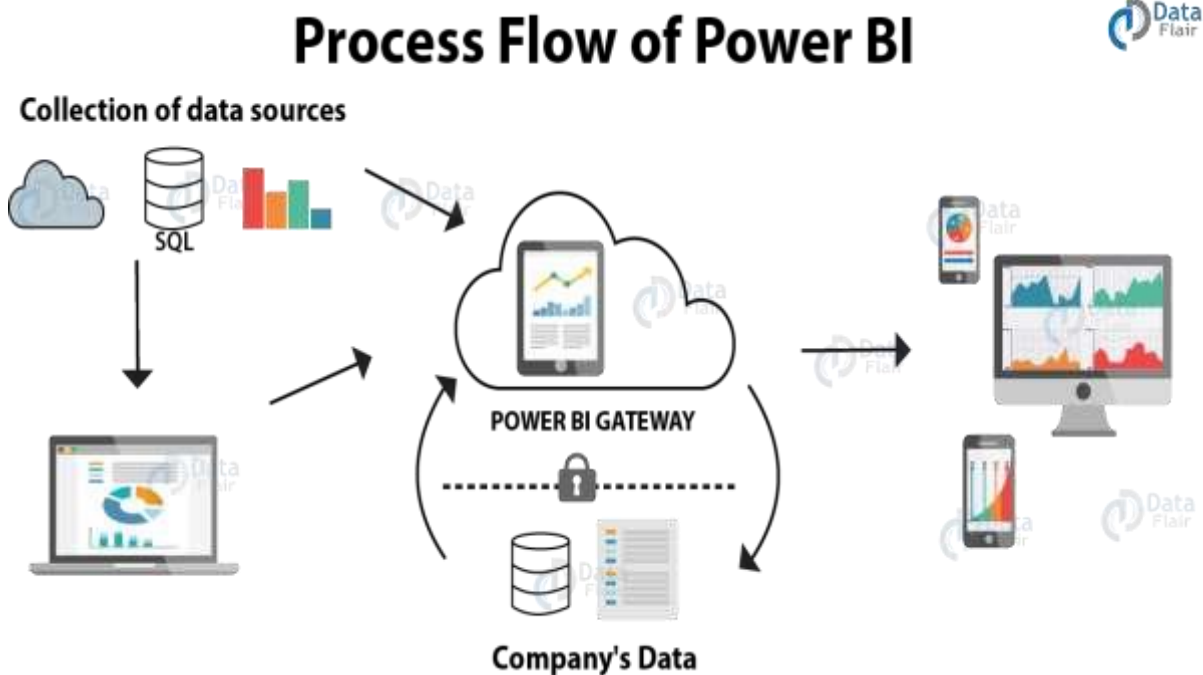
## 2. Architecture



## Power BI Server Architecture

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

The following diagram shows Power BI Server's architecture:



Power BI Server is internally managed by the multiple server processes.

### 1. Gateway/Load Balancer

It acts as an Entry gate to the Power BI 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 Power BI Server web and mobile interfaces. When a user opens a view in a client device, that user starts a session on Power BI Server. This means that an Application Server thread starts and checks the permissions for that user and that view.

### 3) Repository: -

Power BI Server Repository is a PostgreSQL database that stores server data. This data includes information about Power BI 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 Power BI Server data sources

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

## 3. Architecture Description

### 3.1. Data Description

The Dataset contains the data about the players like their height, wingspan, agility, sprint etc

1. Player: Player name
2. Year: Number of years
3. Draft Pick: Number of times the player got picked
4. Height: Height of the player

5. Wingspan: Horizontal hands reach of the player
6. Agility: Agility of the player
7. Sprint: Sprinting of the player

### 3.2. Web Scrapping

Web scraping is a technique to automatically extract content and data from websites using bots. It is also known as web data extraction or web harvesting. Web scrapping is made simple now days, many tools are used for web scrapping. Some of python libraries used for web scrapping are Beautiful Soup, Scrapy, Selenium, etc.

### 3.3. Data Transformation

In the Transformation Process, we will convert our original datasets with other necessary attributes format. And will merge it with the Scrapped dataset.

### 3.4. Data Insertion into Database

- a. Database Creation and connection - Create a database with name passed. If the database is already created, open the connection to the database.
- b. Table creation in the database.
- c. Insertion of files in the table

### 3.5 Make the SQL connection and set up the data source

#### Step 1: Configuring Power BI

Launch Power BI on your workstation and select SQL Server from the connect column on the left. This will open a dialogue box where you need to provide the connection details for SQL Server.

To connect with Power BI, you will need to provide information about the server which hosts your database. If you want to connect to a contained database, you can also specify the name of the database.

To connect with a port other than the default port, you need to specify the port and server as follows:

Example query: my\_server 8051



There are two ways in which you can sign-in to the server, either by using Windows authentication or by using the username and password. Using the username and password becomes a must if you're working with a password-protected server in a non-Kerberos environment.

Click on Sign in to establish a connection. This will enable a connection without SSL. To establish an SSL enabled connection, click the Require SSL checkbox before you sign in.

SQL Server provides an option to let the user queries access the modified rows even before they have been committed. This option is called Read Uncommitted data. It saves time by preventing complex queries such as extract refreshes from locking the database and causing a delay. If this option is unchecked, Power BI makes use of default isolation levels.

If you want to run a specific SQL command every-time a new connection is established, you can use the Initial SQL option. This will open a dialogue box, where you can specify your desired SQL query.

## Step 2: Configuring Data Source

The data source page loads up after configuring the Power BI connector and successfully signing in. This is how the page looks like:

Select the data source name option and give a unique name to the database you are using. It's considered a good practice to have a unique name as it makes it much easier for users to identify the database from which data is being fetched.

To select the desired schema, you can use the schema drop-down list from the column on the left. You can also perform a text-based search to find the desired option. Now similarly find and select the desired table and drag it onto the canvas.

This is how you can connect SQL Server with Power BI. Now click on the sheets tab to begin the analysis.

Custom SQL features can be used to focus on specific SQL statements, rather than querying the entire database. Click on the Custom SQL option from the panel on the left. A new dialogue box will now open up, where you can provide the query you want to execute.

### 3.5. Export Data from Database

Data Export from Database - The data in a stored database is exported as a CSV file to be used for Data Preprocessing.

### 3.6 Deployment.

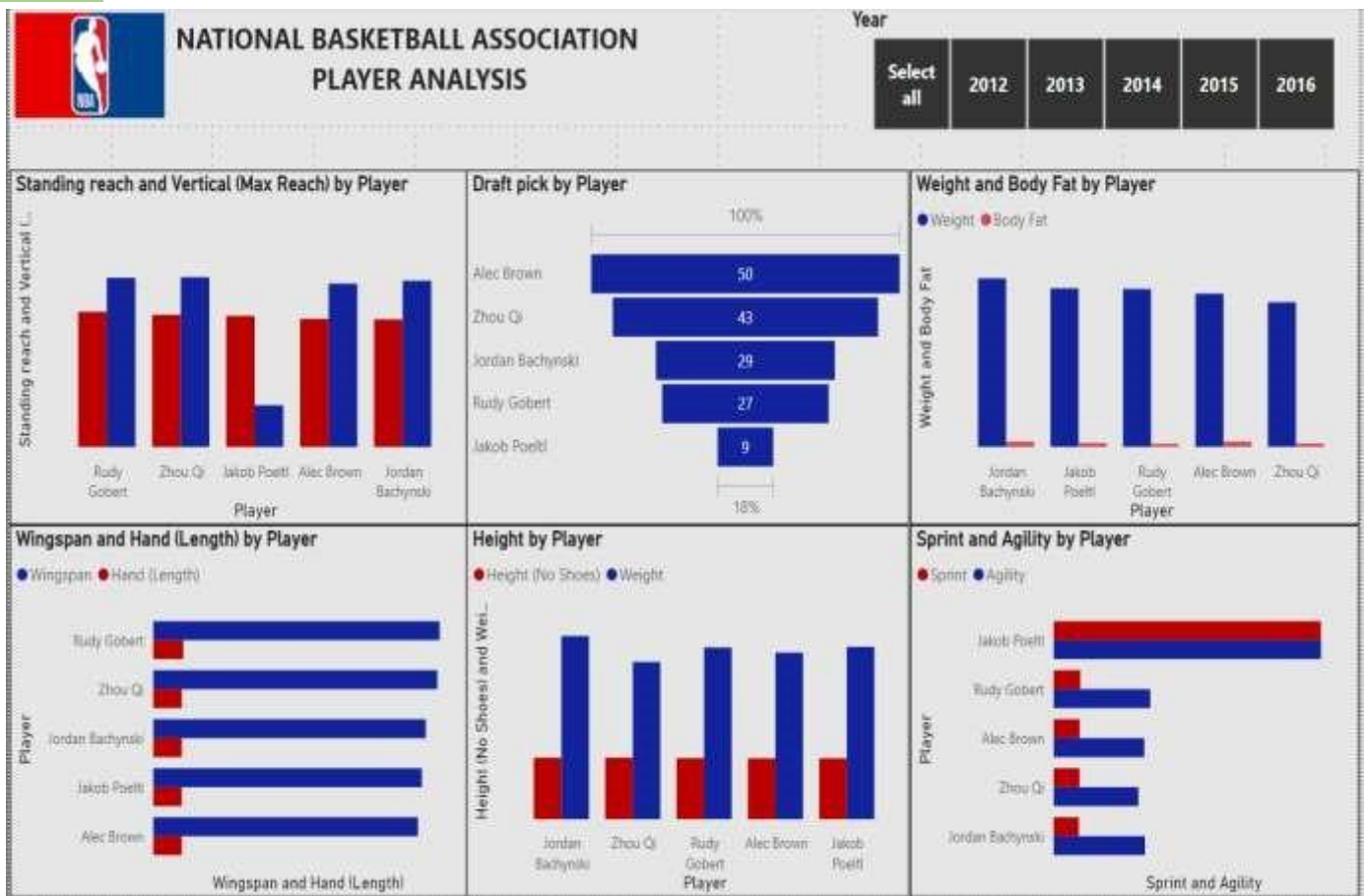
Once you've completed your dashboard, follow these steps:- **Server, Power BI Public, Save to Power BI Public As**

You may be prompted to log into your Power BI Public profile first if this is your first time publishing.

Next, fill out the title you want your viz to have and click "save".

This message means that your connection to the Sample-Superstore data set is a live connection. Power BI Public cannot host live connections, so you'll need to convert your connection to an extract (like a frozen screenshot of your data).

Here in the below screenshot, we can see that our workbook has been published to Power BI public.



#### 4. Unit Test Cases

TEST CASE DESCRIPTION	EXPECTED RESULTS
Year slicer	When clicked on the slicer, this should give the visuals according to the selected year