

Optimising Primavera P6 Reporting with Power BI

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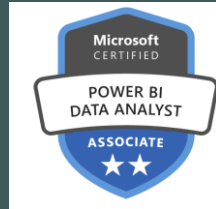
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About me



Juliana Smith (CITP MBCS)

Senior Consultant (Data Automation and Analytics Turner & Townsend)
15+ years of experience working with data, across multiple industries.
Power BI user since 2020.



Agenda



Introduction



Connecting Power BI to P6



Case Study - Transforming P6 data extract (Excel file)



Facts and Dimension Tables



Calculations and Visuals: Creating S-Curves



Accessibility in Power BI



Q&A

Introduction



Oracle Primavera P6 Enterprise Project Portfolio Management
Deployment: Cloud-based.



Primavera P6 Professional Project Management
Deployment: individual workstations



Oracle Primavera Cloud
Deployment: Cloud-based.

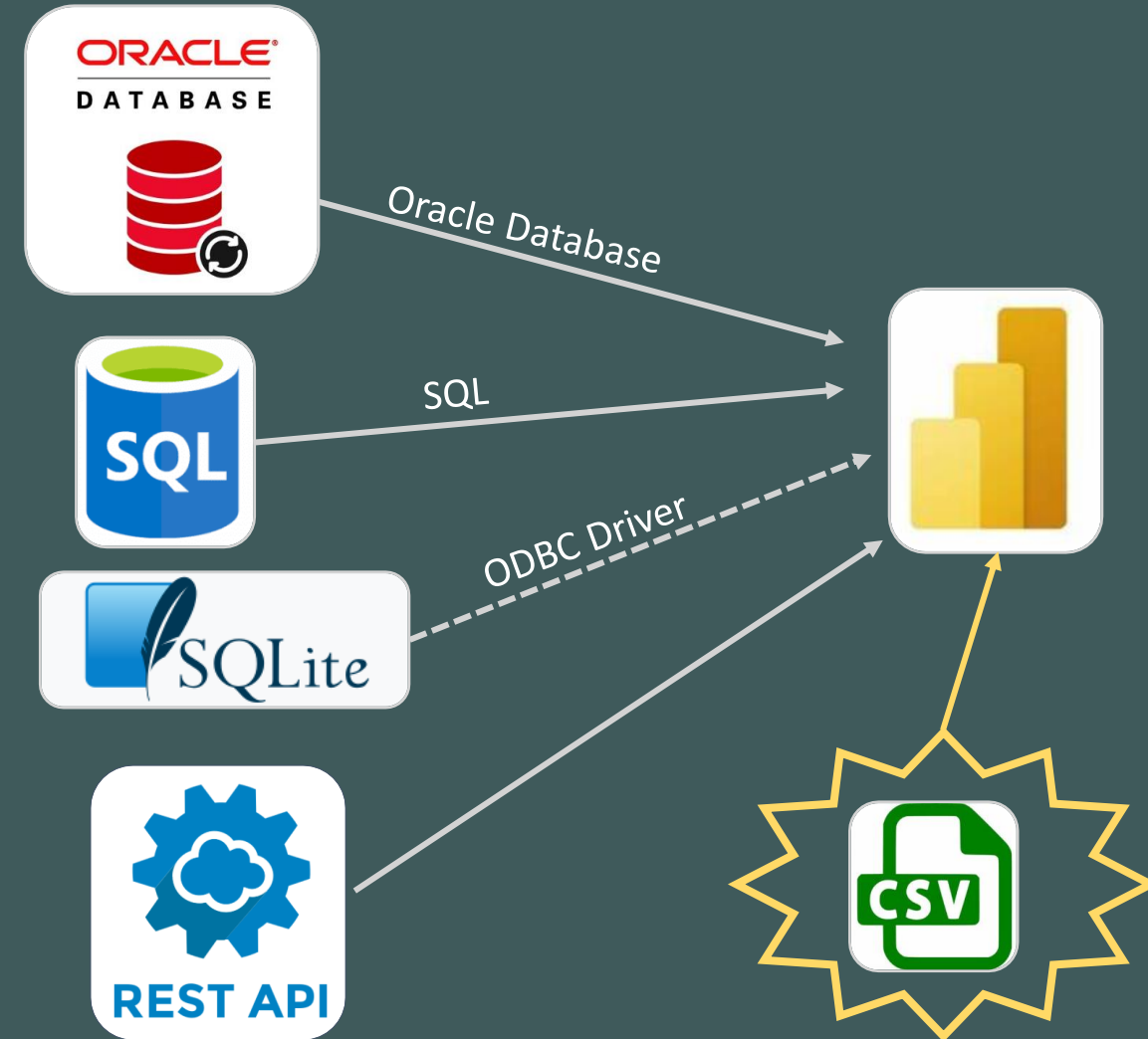


Introduction

Integrating Power BI with Primavera P6 enhances project management by combining advanced analytics with robust planning tools.

Key benefits include

1. Enhanced Visualisation
2. In-Depth Analysis
3. Data Integration
4. Custom Reporting
5. Real-Time Updates: Provides up-to-date information for timely decision-making.



Connecting Power BI to P6

Set Up the Oracle Database Connection

ORACLE
DATABASE



Ensure you have Oracle Client for Microsoft Tools (OCMT) installed on the computer running Power BI Desktop

1. OCMT depends on which version of Power BI Desktop you've installed: 32-bit or 64-bit. It also depends on your version of Oracle server → identify Power BI version → Install OMCT Oracle Client for Microsoft Tools
2. Set up Oracle Database connectivity Oracle Instructions
3. **Set up the TNS (Transparent Network Substrate) names.** The `tnsnames.ora` file typically contains the database connection details and is usually found in the `network/admin` directory of the Oracle client installation.
4. Power BI → Get Data → `Oracle database` → Select
 - 4.1. Enter the Oracle server name (as specified in your `tnsnames.ora` file) and the database name → OK
 - 4.2. Enter the Oracle database credentials (username and password) → Connect

5. Performance Optimisation: Limit the amount of data queried by using appropriate WHERE clauses in your SQL statements.

6. Data Security: Ensure secure handling of credentials, using encryption where necessary.

Connecting Power BI to P6

Set Up the SQL Server Database Connection



- Ensure that you have the **necessary SQL Server credentials, and that the SQL Server instance is accessible from your machine.**
- Extract Data from Primavera P6 Primavera P6 stores its data in **SQL Server databases**, and you can write SQL queries to extract the necessary data from the Primavera P6 tables.
- Connect Power BI to SQL Server Database You need to set up the connection in Power BI to the **SQL Server database**
- Enter Credentials: choose the authentication method (Windows or Database) and enter the credentials. → `Connect`.

- 1. Use Efficient Queries: Write optimised SQL queries to fetch only the required data.**
- 2. Data Modeling: Ensure your data model is properly normalised in SQL Server to enhance performance and maintainability.**
- 3. Credentials Management: Use secure methods to store and manage database credentials in Power BI, such as using Power BI's credential storage options**

Connecting Power BI to P6

Set Up the SQLite



To connect the Power BI to SQLite/P6 PPM, you need to use the ODBC [Open Database Connectivity] connector.

- Set Up the SQLite Database Connection **Ensure you have the SQLite database file for Primavera P6 and the necessary SQLite ODBC driver installed**
- Download and install the SQLite ODBC driver from the SQLite ODBC Driver download page - <http://www.ch-werner.de/sqliteodbc/>
- Extract Data from Primavera P6 Primavera P6 stores its data in the SQLite database file. You can write SQL queries to extract the necessary data from the Primavera P6 tables.
- Connect Power BI to SQLite Database To connect Power BI to SQLite, **you need to use the ODBC driver:**

1. Configure ODBC Data Source

1.1. Open the ODBC Data Source Administrator → `User DSN` or `System DSN` → `Add`.

1.2. Choose the `SQLite3 ODBC Driver` → `Finish`

1.3. Fill in the Data Source Name (DSN) and Database Name (the path to your SQLite database file) → Click `OK` to save the DSN.

2. Connect Power BI to the ODBC Data Source

2.1. Get Data → ODBC → Connect

2.2. Select DSN configured and data source name → OK → Enter credentials (if required) → Connect

2.3. Advanced Options → enter SQL query

Connecting Power BI to P6

REST APIs



Primavera P6 EPPM (Enterprise Project Portfolio Management)

- API Name: [P6 EPPM Rest API \(oracle.com\)](https://p6.eppm.oracle.com/)
- The API is installed as part of P6 EPPM Web Services.
- All API endpoints follow a consistent pattern: **`https://<hostName>:<portNumber>/p6ws/restapi/<service>`**

1. **Generate an OAuth Token:** First, obtain an OAuth token by authenticating with the P6 EPPM server
2. **Retrieve Data from P6 EPPM:** Use the access token to make authenticated requests to the relevant P6 EPPM endpoints.

Example

```
curl -X GET "https://<Primavera host>/p6ws/restapi/project?Fields=Name" \  
-H "Authorization: Bearer <OAuth-Access-Token>" \  
-H "Content-Type: application/json"
```

3. **Power BI:** New Data source → Choose “Web” → enter the URL of your P6 EPPM REST API endpoint. Use the access token as the authentication method

Examples

Get Projects

```
`GET /p6ws/restapis/projects`
```

Get Resources

```
`GET /p6ws/restapis/resources`
```

Get Activities

```
`GET /p6ws/restapis/projects/{projectId}/activities`
```

4. **Data Transformation:** Use Power Query to handle the JSON data returned from the API, transforming it into a tabular format suitable for analysis in Power BI

5. Error handling

6. Incremental Data Load

Connecting Power BI to P6

Connecting to CSV or Excel exports



In P6 the data can be exported and saved as CSV or Excel format.

- Easiest way to share across teams
- No need for direct database access for basic analysis
- Simple alterations can be done easily

1. Ensure Proper Date Formatting

Attention: in P6 the date can be formatted using 2-digit year

- Excel pivot year ambiguity
- Historical project data may appear as future dates or vice versa

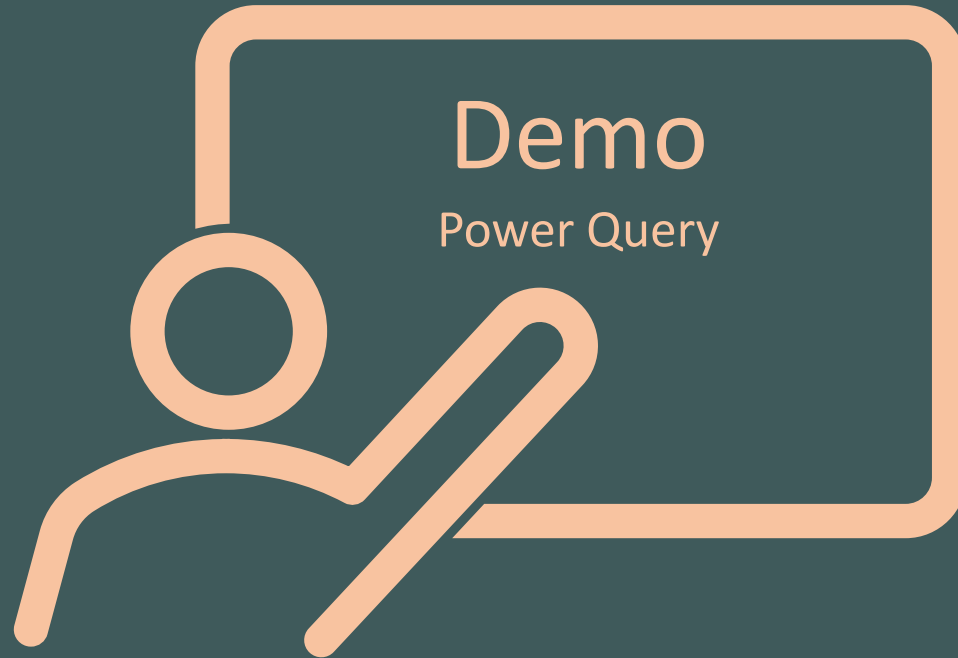
- 01/01/20 { January 1st 2020
January 1st 1920
- 01/01/30 - January 1st 1930



In P6, set the year to use 4-digits

2. Only use necessary data
3. Consistent Naming Conventions
4. Leverage Power Query
5. Optimise Performance
6. Establish Relationships
7. Regular Updates and Maintenance

Case Study Transforming P6 data extract



Facts and Dimension Tables

Key Dimension Tables

- **WBS (Work Breakdown Structure) Details**

Attributes: WBS ID, WBS Name, WBS Description, Parent WBS ID, Level, Helps in organizing and summarizing project tasks and activities.

- **Project Details**

Attributes: Project ID, Project Name, Project Manager, Start Date, End Date, Status, Budget, , etc.

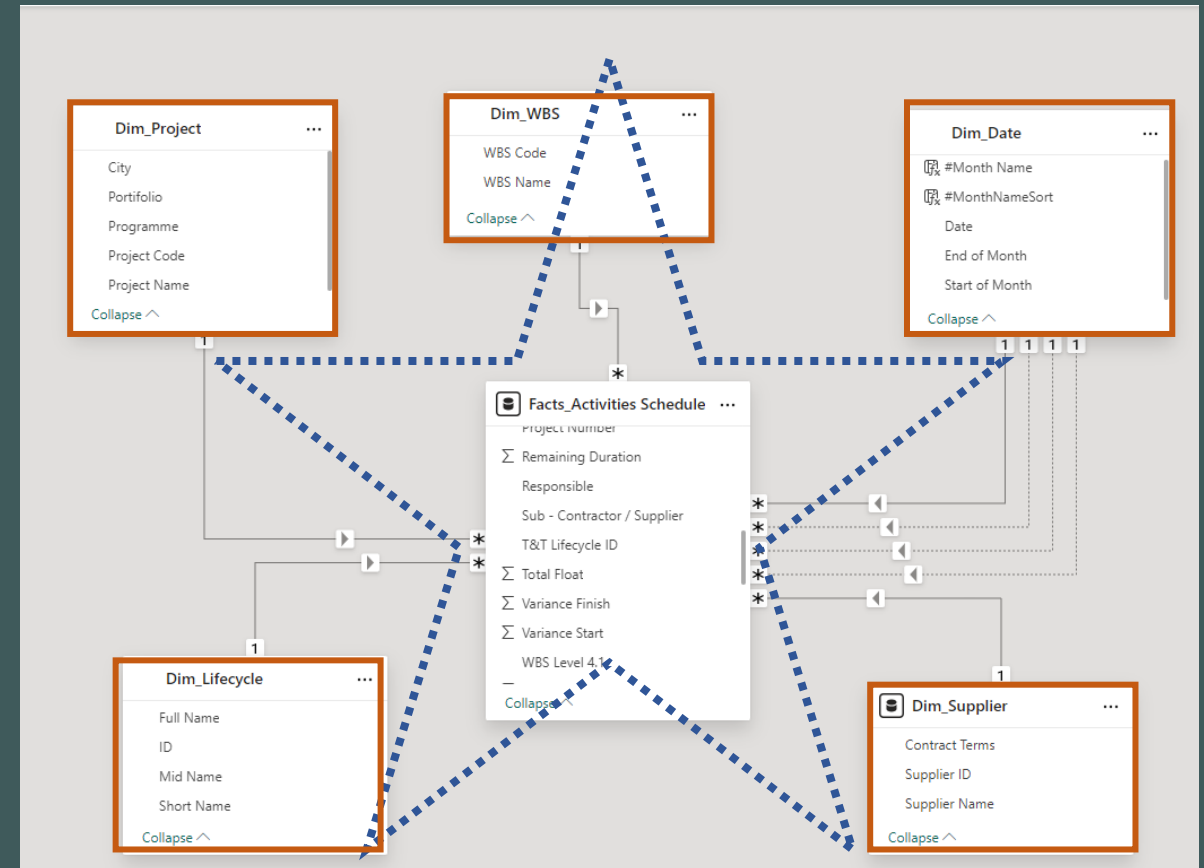
Provides a high-level overview and key details about each project.

- **Supplier Details**

Attributes: Supplier ID, Supplier Name, Contact Information, Contract Terms, Performance Ratings, etc. Tracks information about suppliers involved in the project, useful for procurement and supplier management analysis.

- **Project Lifecycle**

Lifecycle Stage ID, Stage Name, Stage Description, Entry Criteria, Exit Criteria, etc. Tracks the different stages of a project's lifecycle, facilitating Stage Gate reviews and reporting



Facts and Dimension Tables

Date Dimension Table

- Ensures uniform date formats and consistent handling of date values across the dataset.
- Simplifies complex date calculations and aggregations.
- Facilitates advanced time-based analysis, such as year-over-year comparisons, monthly trends, and seasonal patterns.
- Supports the creation of time-based visualisations, such as S-curves, timelines, and Gantt charts.
- Enhances query performance by leveraging optimised date structures.

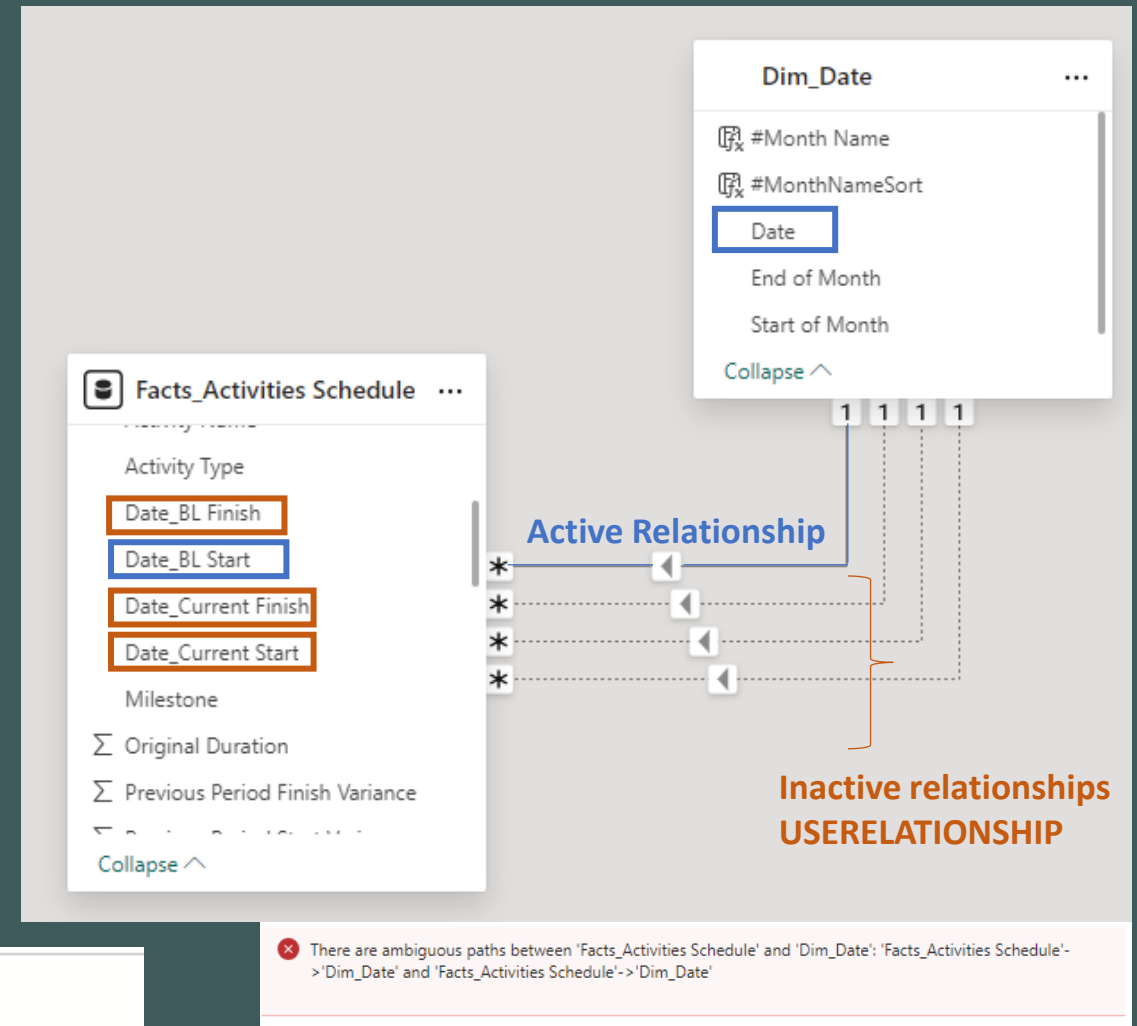
Typical date columns in P6 include

- Start Date
- Finish Date
- Baseline Start Date
- Baseline Finish Date

Dim Date = Uniform Date Context

Blank query in PQ → List Tools --> Convert to Table
(creates a list)

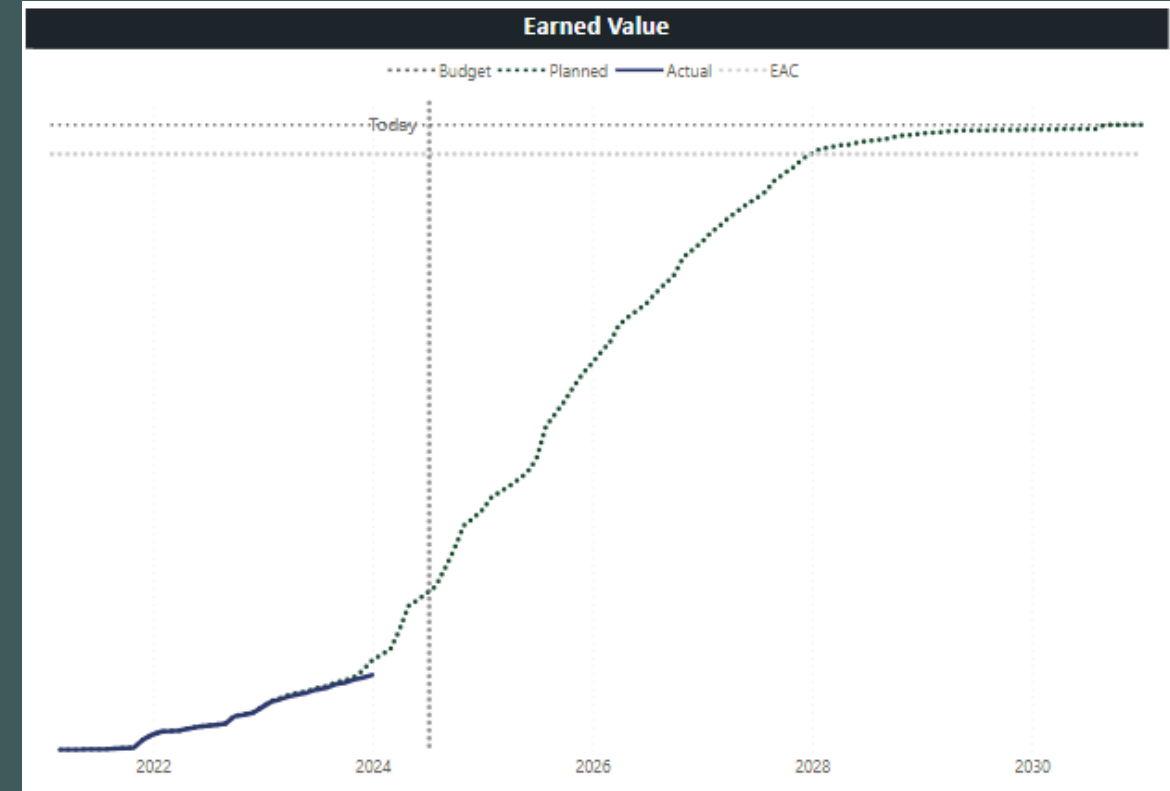
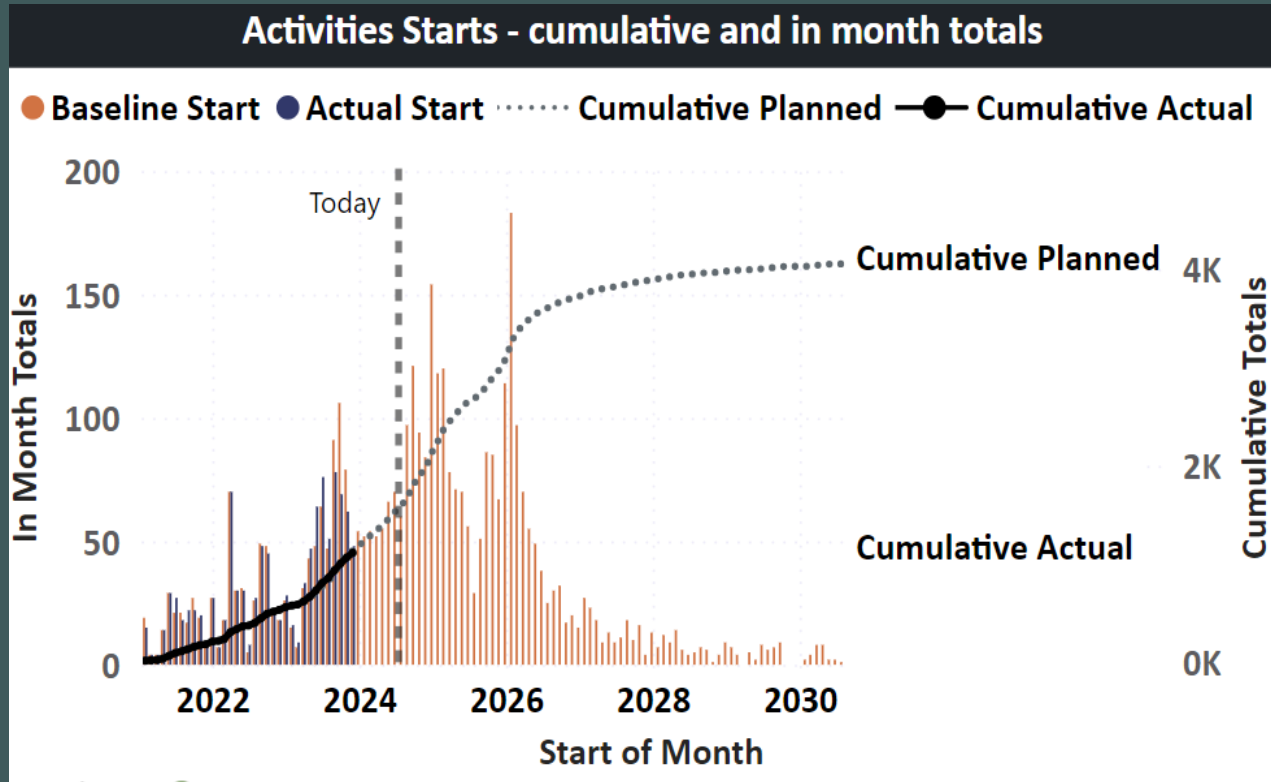
```
let
    StartDate = Date.From("01/07/2022"),
    EndDate = Date.From("31/08/2025"),
    FullDates = List.Dates(StartDate, Number.From(EndDate) - Number.From(StartDate)+1, #duration(1,0,0,0))
in
    FullDates
```



Calculations and Visuals: Creating S-Curves

S-Curves

Graphical tools used to track cumulative data, such as costs, hours worked, or progress, over time.



The S-Curve has three distinct phases:

- Initial Phase
- Middle Phase
- Late Phase

Calculations and Visuals: Creating S-Curves

Schedule S-Curves

- Count Activities Planned Start – Baseline Date
- Count Activities Started – Forecast/Actualised Date
(same process for Milestones and Activities Finishes)

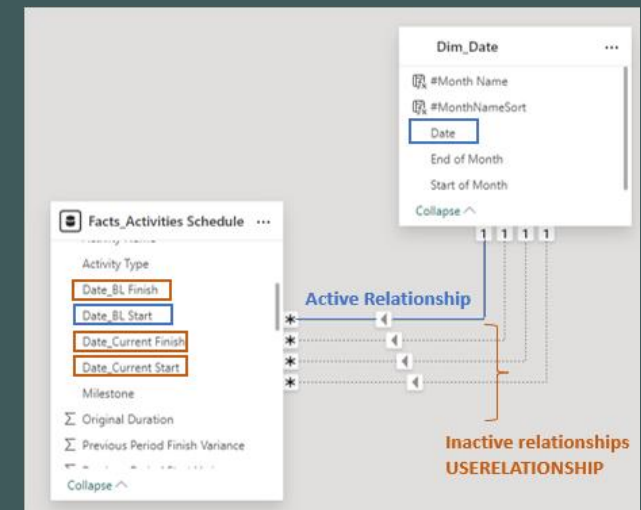
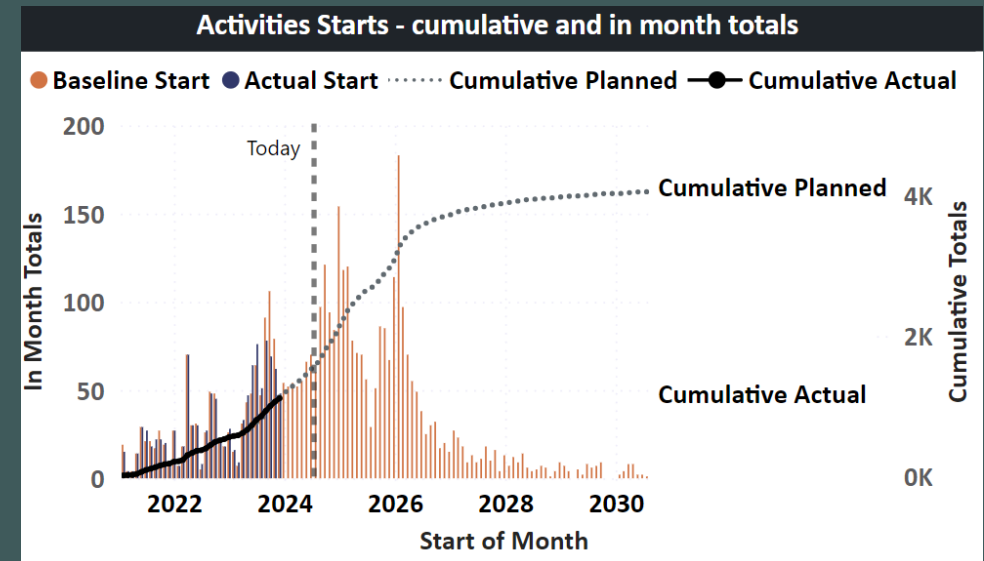
1 - Monthly Values

Active Relationship between Dim_Date and Facts_Activities Schedule Column Date_BL Start

```
1 _Count_Activites_PlanStart = CALCULATE(
2   COUNTROWS(
3     FILTER('Facts_Activities Schedule',
4       NOT(ISBLANK('Facts_Activities Schedule'[Date_BL Start])))))
```

Inactive Relationship between Dim_Date and Facts_Activities Schedule Column Date_Current Start

```
1 _Count_ActivitesStarted_OverTime = CALCULATE(COUNTROWS(
2   FILTER('Facts_Activities Schedule','Facts_Activities Schedule'[#Activities_StartCheck]=1)),
3   USERRELATIONSHIP 'Facts_Activities Schedule'[Date_Current Start],Lookup_Date[Date])
4   )+0
```



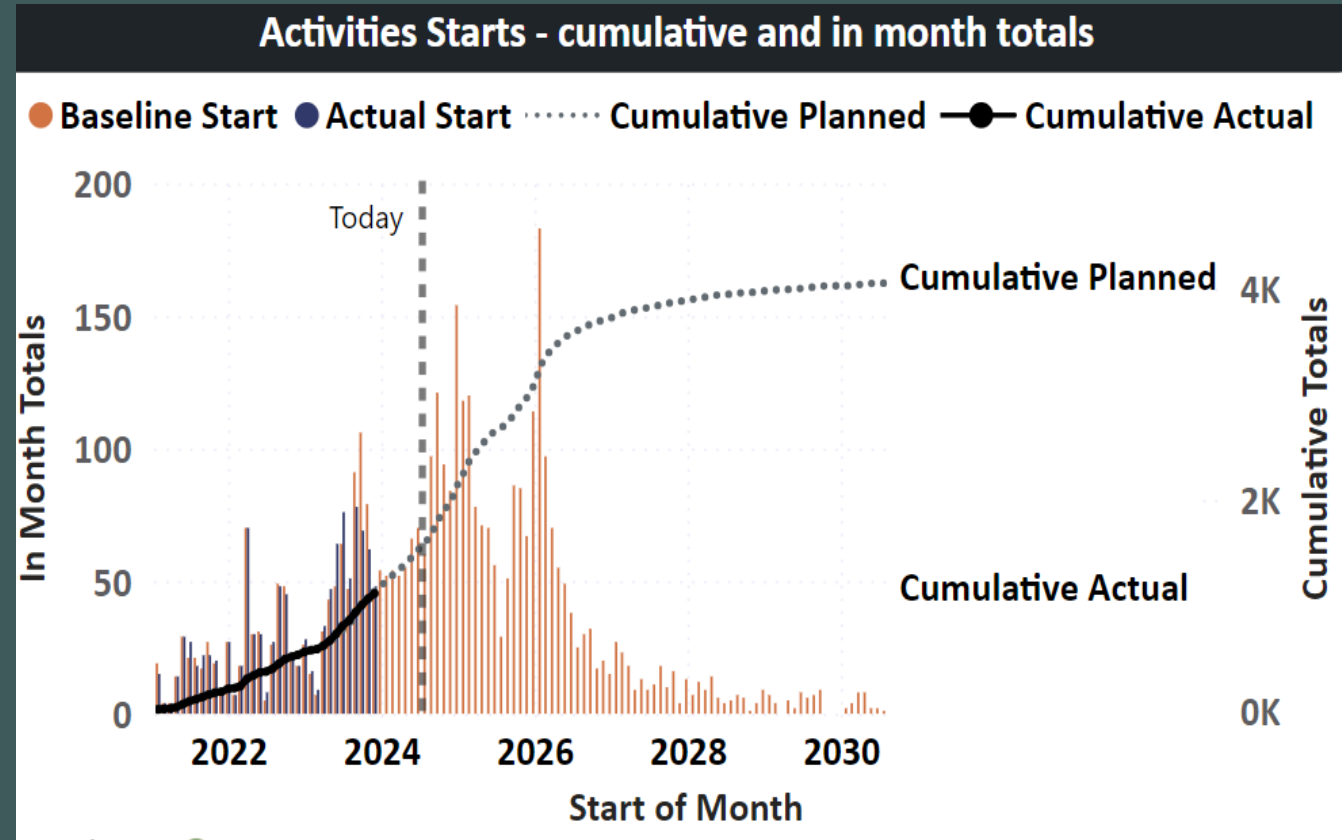
Calculations and Visuals: Creating S-Curves

Schedule S-Curves

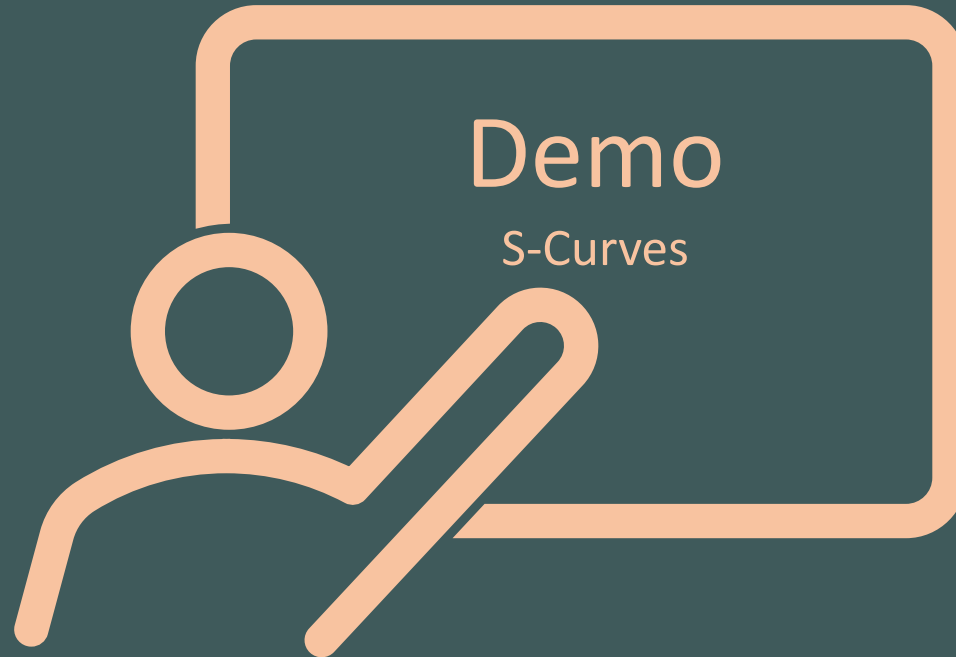
2 - Cumulative Values

```
1 _Count_Activites_PlanStarts_cumulative =  
2  
3 CALCULATE(  
4     [_Count_Activites_PlanStart],  
5     FILTER(  
6         ALLSELECTED('Lookup_Date'[Date]),  
7         'Lookup_Date'[Date] <= MAX('Lookup_Date'[Date]))  
8 )
```

```
1 _Count_ActivitesStarted_OverTime_cumulative =  
2 IF([_Count_ActivitesStarted_OverTime]=0,BLANK(),  
3  
4     CALCULATE(  
5         [_Count_ActivitesStarted_OverTime],  
6         FILTER(  
7             ALLSELECTED('Lookup_Date'[Date]),  
8             'Lookup_Date'[Date] <= MAX('Lookup_Date'[Date]))  
9     ))
```



Calculations and Visuals: Creating S-Curves



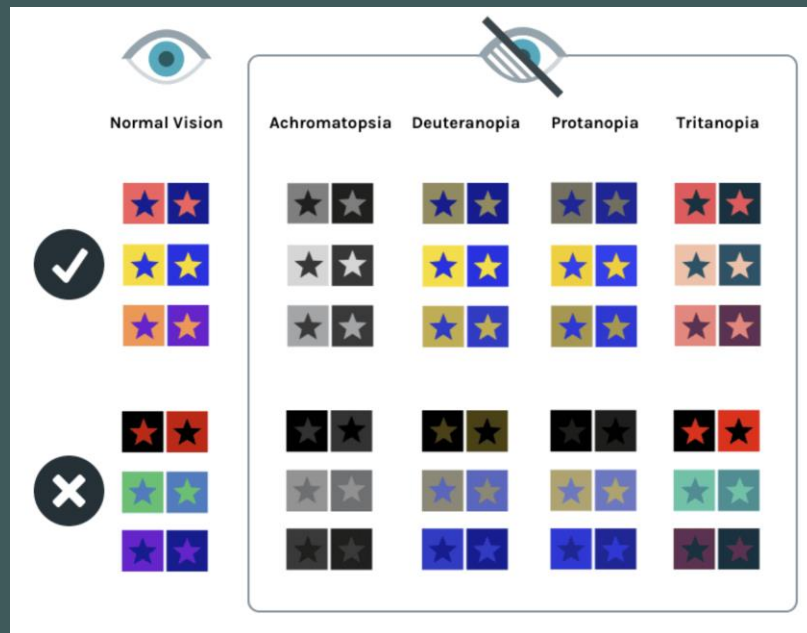
Accessibility in Power BI

Colour Accessibility

When working on the page design and deciding the colour theme, bear in mind some people are not capable to see the difference between certain colours. Design isn't truly inclusive until it caters to users with needs different from the norm.

Colour blindness - Approximately 350 million people around the world experience some form of colour blindness: 1 in 12 males (8%) and 1 in 200 females (0.5%). Additionally, there are several other common conditions that affect our ability to see colours and data visualisations.

Accessible Colours: colour combinations that have enough contrast to ensure layered elements on a page are distinguishable for those who are visually impaired or deficient in colour vision. **The Web Content Accessibility Guidelines (WCAG)** provides clear recommendations on how to make content accessible for everyone, regardless of disability or device.



Avoid Combinations

Green & Red

Green & Brown

Blue & Purple

Green & Blue

Light Green & Yellow

Blue & Grey

Green & Grey

Green & Black



Accessibility in Power BI

Colour Accessibility – Power BI Accessible Themes



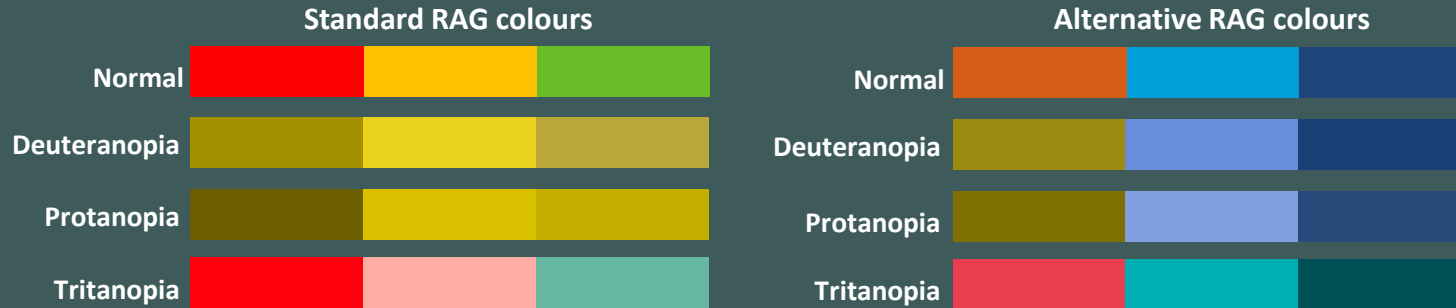
	#59A33A	#AD8F21	#E56E1D	#7B1C25	#14482C	#2D386D	#661F89	#5C97D2
Normal								
Deuteranopia								
Protanopia								
Tritanopia								

	#C480A7	#EC64A9	#6E98B5	#7D99AD	#666666	#364B59	#663466	#67002E
Normal								
Deuteranopia								
Protanopia								
Tritanopia								

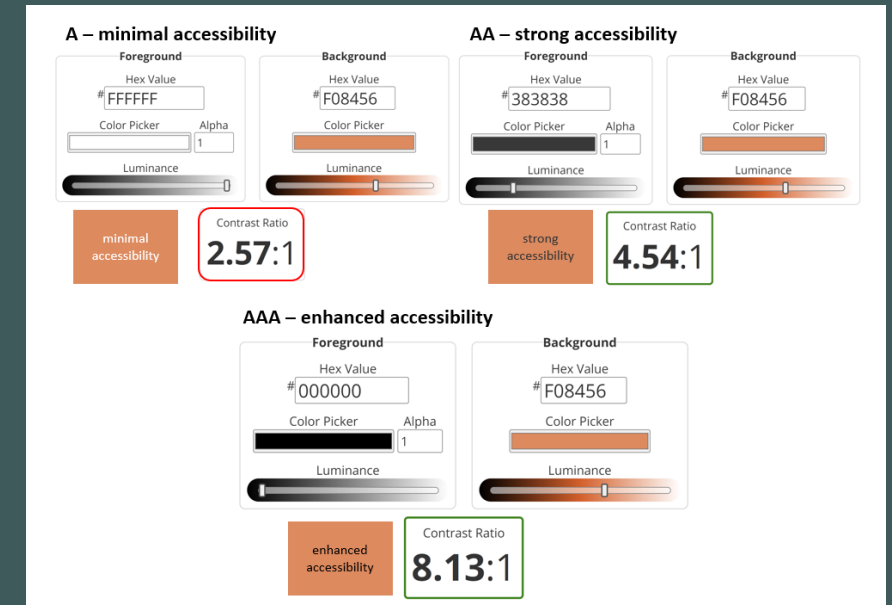
Accessibility in Power BI

Colour Simulations & Contrast Checker

Colour-blindness simulation using [Color blind safe colors on color wheel](#) | Adobe Color



Colour contrast calculated using [WebAIM: Contrast Checker](#)
Foreground vs Background



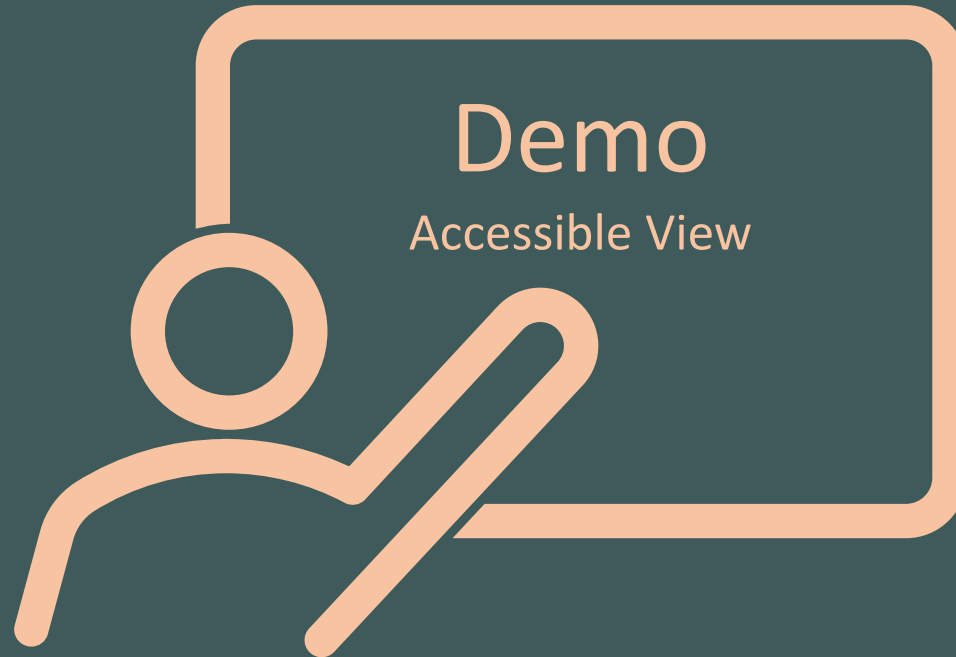
WCAG 2.2

A - minimal accessibility (contrast ratio below 4.5:1)

AA – strong accessibility (contrast ratio above 4.5:1)

AAA – enhanced accessibility (contrast ratio above 7:1)

Accessibility in Power BI



Questions & Answers

