Western Downs Regional Council

Power BI Reporting

Solution Overview

Date: 9 December 2016

Version: 0.1

Document Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| Version | Revision date | Author | Description |
| 0.1 | 9 Dec 2016 | Rob Spirat / Brett Edwards | Initial draft of WDRC Power BI reporting solution. |

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# WDRC Power BI Reporting System Overview

Wardy IT Solutions have implemented a Microsoft Power BI reporting solution for Western Downs Regional Council. The solution takes data from the Authority source system and publishes reports related to corporate functions including:

* Financials: Actuals and Budgets.
* Human Resources: Headcounts and FTEs, Hires and Termination, and Absenteeism.

## Purpose

The document is a guide for internal and external developers on the processes for managing and maintaining the Western Downs Regional Council Power BI solution.

## Intended Audience

The table below describes the intended audience for this document and the benefits they will gain:

|  |  |
| --- | --- |
| Audience | Benefits |
| WDRC Staff | Understanding the components of the Power BI reports including how data and what information is required to add new reports. |
| Business Intelligence Developers | Understanding of the solution for the purpose of extending and maintaining the solution. |

## Scope of Engagement

The scope of this document is the Power BI reporting solution developed for Western Downs Regional Council. This includes the tasks required to take data from Authority and publish to Power BI reports.

This document provides the technical documentation of the solution. It is not a user guide for the WDRC reports or Power BI in general.

## References

For this project, this Solution Overview provides the complete technical documentation of the solution. No additional documentation is required.

|  |  |
| --- | --- |
| Document | Description |
|  |  |
|  |  |

## Acronyms and Terms

|  |  |
| --- | --- |
| Acronym | Definition |
| BI | Business Intelligence. |
| DBA | Database Administrator. Role responsible for maintaining databases and database servers. |
| ETL | Extract-Transform-Load. Common data warehousing term to describe the process of extracting data from a source system, performing data transformations on it, then loading into a suitable location for reporting. |
| SSAS | Microsoft SQL Server Analysis Services. Analytical OLAP database engine for multi-dimensional cubes. |
| SSIS | Microsoft SQL Server Integration Services. Tool for transferring and transforming data between or within databases. |
| SSMS | Microsoft SQL Server Management Studio. Administrator tool for connecting to, querying, and managing databases, cubes and integration packages. |
| SSRS | Microsoft SQL Server Reporting Services. |
| SQL Server | Microsoft SQL Server relational database engine with included products such as SSAS, SSIS and SSRS. Often refers to the relational database engine alone. |
| SQL | Structure Query Language. Computer language for querying and modifying relational databases. Main language used by Microsoft SQL Server. |

# WDRC Power BI Reporting System Overview

Western Downs Regional Council’s uses a streamlined reporting model. Data is extracted from the Civica Authority[[1]](#footnote-1) source system and loaded into data staging database, simply named Reports.

## Source Systems

The source data is retrieved from the Authority database, the Authlive SQL Server database on prd-da-db01\auth.

Only the data that is required for reporting is extracted from the Authority database. An SQL statement has been provided by the WDRC analysts for each report.

## ETL Tasks and Reports Database

SQL Server Integration Services (SSIS) is used to extract data from Authority and copy to the Reports database.

The ETL pattern applied is truncate and load. This the simple and effective process performs the following steps for each report:

1. Deletes all rows in the destination table in the Reports database,
2. Runs the WDRC provided query against the Authority database,
3. Loads all data into the destination table in the Reports database.

ETL packages must be developed

## Power BI Reports

Power BI Desktop[[2]](#footnote-2) is employed to build the reports. One Power BI workbook (.pbix file) is created per source query. The Power BI workbooks extract data from the Reports database and persist it within the workbook.

Power BI workbooks should be built on the DAC-TS02 workstation, which is the landing point for remoting into the WDRC environment. This workstation includes the Power BI version employed by WDRC, along with permission to connect to the Authority SQL Server instance. Data can be loaded into the Power BI workbooks from this workstation.

## Office 365

An O365 group is used to enable collaboration and multiple report authors. Reports are uploaded to Western Downs Regional Council Office 365 portal at:

<https://wdrc.sharepoint.com/>

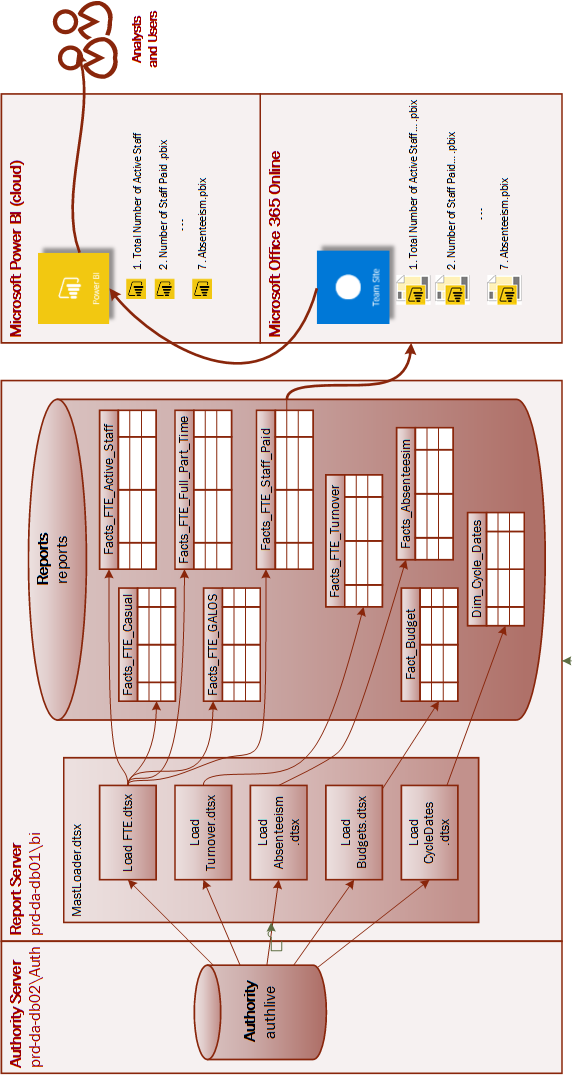
Use the ICT BI team directory:

<https://wdrc.sharepoint.com/sites/ictbiteam/Shared%20Documents/Forms/AllItems.aspx>

## Power BI Online

Reports are published to PowerBI.com. The Pro version is used to as it supports workgroups. Use the ICT BI Team workspace.

Figure : WDRC Power BI Reporting System Overview



# Development Solution

## Approach

There are four steps in the production of Business Intelligence (BI) reports at Wester Downs Region Council. These are:

1. Document the story around what is being reported
2. Design the data extraction to accommodate the data requirements
3. Develop and publish the reports using Power BI
4. Add tiles to the relevant dashboards

Although the approach uses Agile development techniques, i.e. iterative development, each step should be completed before the next.

## Environments

All work is performed in the single production environment. Service are listed in Table 1. Remote connection is available through Check Point Mobile VPN software.

|  |  |  |
| --- | --- | --- |
| Service | Location | Details |
| Workstation | DAC-TS02 | Terminal Services\Remote Desktop workstation. Includes:   * Power BI Desktop (September 2016). |
| SQL Server Instance - Authority | DAC-LGMS02\Authority | SQL Server 2016 Standard Edition database server. Includes the following databases:   * Authority |
| Windows Server - Reports | PRD-DA-DB01 | Windows server containing the SQL Server Instance for the Reports database. Also contains:   * Visual Studio 2015 with SQL Server Data Tools for SQL Server 2016. * Power BI Gateway installed |
| SQL Server Instance - Reports | PRD-DA-DB01\BI | SQL Server 2016 Standard Edition database server. Includes the following databases:   * Reports |

Table 1: Production Environment

## Source Control

No source control is applied to the ETL jobs. It is recommended to take a zip of the ETL jobs at the end of each sprint or periodically and copied to the shared file server:

\\dac-fs01\shared\Finance & ICT\Financial Systems\BI Dashboard

This directory is mapped as the S: drive on dac-ts-01.

Note that Office 365 does provide history of the Power BI workbooks (.pbix files) by right clicking on the file and selecting Version History.

## Projects

One Visual Studio solution contains the SQL Server Integration Packages used to copy data from the Authority database into the Reports database.

E:\Projects\PowerBI\_Dataload\PowerBI\_Dataload\PowerBI\_Dataload.sln

### PowerBI\_Dataload

This is the SQL Server Integration solution that migrates data from Authority to the Reports database. MasterLoader.dtsx is the master package that coordinates the execution of all other packages.

The Integration project uses Encrypt Sensitive with Password protection model. This mode is preferred when packages are deployed to the SSIS catalog.

The package password is: wdrc

## Deployment

### PowerBI\_Dataload

The SSIS project is deployed to the PowerBI\_DataLoad folder in the SSIS Catalog on PRD-DA-DB01\BI.

### Reports Database

Use the Publish option in Visual Studio to migrate changes from the project to the Reports database on PRD-DA-DB01\BI.

### Scheduling

A SQL Server Agent job must be created on the server PRD-DA-DB01\BI to refresh the data in the Reports database each night. The initial version of the job took approximately 30 seconds to execute.

To allow the job to run automatically, the following database permissions were changed:

* SQL Agent service account (WDRC\PRD.BI.Agent$) has been granted read only access to the AuthLive database on PRD-DA-DB02\AUTH.
* SQL Agent service account (WDRC\PRD.BI.Agent$) has been granted read and write access to the Reports database on PRD-DA-DB01\BI.

|  |  |
| --- | --- |
| Property | Details |
| Name: | WDRC Reports – Master |
| Steps: | 1. Execute SSIS Package MastLoader.dtsx. |
| Schedule: | Once per day at 12am. |

Table 2: SQL Server Agent Job

### User Security

Power BI Admin account = [s\_powerbi@wdrc.qld.gov.au](mailto:s_powerbi@wdrc.qld.gov.au)

Password: Rv12j#IZPkm

Recovery Key : WesterD0wns!

# Data Model

## Dim\_Cycle\_Dates

Dim\_Cycle\_Dates lists the standard pay periods.

|  |  |  |  |
| --- | --- | --- | --- |
| Columns | Data Type | Source | Example |
| Pay Period Id | Varchar(6) |  |  |
| Financial Year | Int |  |  |
| Pay Cycle Number | Int |  |  |
| Pay Period Number | Int |  |  |
| Pay Period Code | Varchar(2) |  |  |
| Pay Period Start Date | Datetime |  |  |
| Pay Period End Date | Datetime |  |  |
| Pay Date | Datetime |  |  |

## Facts\_Absenteeism

|  |  |  |  |
| --- | --- | --- | --- |
| Columns | Data Type | Source | Example |
| Employee Number | int |  |  |
| Employee Name | varchar(50) |  |  |
| Department Number | Int |  |  |
| Year | Int |  |  |
| Leave From | datetime |  |  |
| Leave To | datetime |  |  |
| Days Taken | Int |  |  |
| Hours Taken | numeric |  |  |
| $ Value | numeric |  |  |
| Leave Type | varchar(20) |  |  |
| Hours Code | Int |  |  |
| Hours Type | varchar(50) |  |  |
| Certificate Code | varchar(20) |  |  |
| Certificate | varchar(50) |  |  |

## Facts\_Budget

|  |  |  |  |
| --- | --- | --- | --- |
| Column | Data Type | Source | Example |
| Ledger Account | varchar(21) |  |  |
| Budget Type | varchar(50) |  |  |
| Division | varchar(50) |  |  |
| Department | varchar(50) |  |  |
| ActivityType | varchar(50) |  |  |
| Revenue or Expenses | varchar(150) |  |  |
| Description of Financial Statement1 | varchar(150) |  |  |
| Description of Financial Statement2 | varchar(150) |  |  |
| Activity | varchar(150) |  |  |
| Actual | decimal |  |  |
| Oncost | decimal |  |  |
| Budget | decimal |  |  |
| Budget YTD | decimal |  |  |
| Actual + Oncost YTD | decimal |  |  |
| Financial Month | varchar(50) |  |  |
| Post Year | varchar(4) |  |  |

## Facts\_Department

|  |  |  |  |
| --- | --- | --- | --- |
| Column | Data Type | Source | Example |
| DepartmentNumber | int |  |  |
| DepartmentName | varchar(100) |  |  |
| Division | varchar(100) |  |  |
| Department | varchar(100) |  |  |

## Facts\_Employee\_Leave

|  |  |  |  |
| --- | --- | --- | --- |
| Column | Data Type | Source | Example |
| Employee Name | varchar(50) |  |  |
| Employee Number | int |  |  |
| Department Number | int |  |  |
| Employment Type | varchar(20) |  |  |
| Pay Cycle | int |  |  |
| Financial Year | int |  |  |
| Annual Leave | decimal |  |  |
| Long Service Leave | decimal |  |  |
| TOIL | decimal |  |  |
| RDO | decimal |  |  |
| Medical | decimal |  |  |
| Annual Leave Pro-rata | decimal |  |  |
| Long Service Leave Pro-rata | decimal |  |  |
| Medical Pro-rata | decimal |  |  |
| Standard Hours per week | decimal |  |  |
| Standard Hours per day | decimal |  |  |

## Facts\_FTE\_Active\_Staff

|  |  |  |  |
| --- | --- | --- | --- |
| Column | Data Type | Source | Example |
| Pay Period Id | varchar(6) |  |  |
| Tax Year | int |  |  |
| Pay Period | varchar(2) |  |  |
| Date End | datetime |  |  |
| Employee Number | int |  |  |
| Employee Name | varchar(50) |  |  |
| Department Number | int |  |  |
| Employment Type | varchar(20) |  |  |
| Start Date | datetime |  |  |
| Termination Date | datetime |  |  |

## Facts\_FTE\_Casual

|  |  |  |  |
| --- | --- | --- | --- |
| Column | Data Type | Source | Example |
| Employee Number | int |  |  |
| Employee Name | varchar(50) |  |  |
| Employment Type | varchar(20) |  |  |
| Department Number | int |  |  |
| Financial Year | int |  |  |
| Pay Cycle | varchar(2) |  |  |
| Pay Period | varchar(2) |  |  |
| Pay Period Id | varchar(6) |  |  |
| Actual Hours | decimal |  |  |
| FTE Prescribed Hours | decimal |  |  |
| fte Hours | decimal |  |  |

## Facts\_FTE\_Full\_Part\_Time

|  |  |  |  |
| --- | --- | --- | --- |
| Column | Data Type | Source | Example |
| Tax Year | int |  |  |
| Pay Period | varchar(2) |  |  |
| Pay Period Id | varchar(6) |  |  |
| Date End | datetime |  |  |
| Employee Number | int |  |  |
| Employee Name | varchar(50) |  |  |
| Department Number | int |  |  |
| Employment Type | varchar(20) |  |  |
| Start Date | datetime |  |  |
| Termination Date | datetime |  |  |
| Standard Hours | decimal |  |  |
| FTE Prescribed Hours | decimal |  |  |
| FTE Hours | decimal |  |  |

## Facts\_FTE\_GALOS

|  |  |  |  |
| --- | --- | --- | --- |
| Column | Data Type | Source | Example |
| Employee Number | int |  |  |
| Employee Name | varchar(50) |  |  |
| Department Number | int |  |  |
| Employment Type | varchar(20) |  |  |
| Date of Birth | datetime |  |  |
| Gender | varchar(20) |  |  |
| Male | int |  |  |
| Female | int |  |  |
| Commenced Work | datetime |  |  |
| Age | int |  |  |
| Length of Service | int |  |  |

## Facts\_FTE\_Staff\_Paid

|  |  |  |  |
| --- | --- | --- | --- |
| Column | Data Type | Source | Example |
| Financial Year | int |  |  |
| Pay Cycle | varchar(2) |  |  |
| Pay Period Number | varchar(2) |  |  |
| Pay Period Id | varchar(6) |  |  |
| Pay Period Start Date | datetime |  |  |
| Pay Period End Date | datetime |  |  |
| Employee Number | int |  |  |
| Adhoc PayCyc | varchar(2) |  |  |
| PayCyc | varchar(2) |  |  |
| Tax Year | int |  |  |
| PayPrd | varchar(2) |  |  |
| Actual Value | decimal |  |  |

## Facts\_FTE\_Turnover

|  |  |  |  |
| --- | --- | --- | --- |
| Column | Data Type | Source | Example |
| Employee Number | int |  |  |
| Employee Name | varchar(50) |  |  |
| Employment Type | varchar(20) |  |  |
| Dept\_Num | int |  |  |
| Budgeted Hours | decimal |  |  |
| Budgeted Ordinary Value | decimal |  |  |
| FTE Prescribed Hours | decimal |  |  |
| Financial Year | int |  |  |
| Pay Cycle Number | int |  |  |
| Pay Period Number | varchar(2) |  |  |
| Pay Period Id | varchar(6) |  |  |
| Actual Hours | decimal |  |  |
| Actual Value | decimal |  |  |
| FTE Based on Actual Hours | decimal |  |  |
| Pay Period Start Date | date |  |  |
| Pay Period End Date | date |  |  |
| Employee Start Date | date |  |  |
| Employee Termination Date | date |  |  |
| Positive Turnover | int |  |  |
| Negative Turnover | int |  |  |

## Facts\_TO\_Commenced

|  |  |  |  |
| --- | --- | --- | --- |
| Column | Data Type | Source | Example |
| Employee Number | int |  |  |
| Employee Name | varchar(50) |  |  |
| Department Number | int |  |  |
| Employment Type | varchar(20) |  |  |
| Employee Start Date | datetime |  |  |
| Employee Termination Date | datetime |  |  |
| Financial Year | int |  |  |
| Pay Cycle | int |  |  |
| Pay Period | varchar(2) |  |  |
| Pay Period Id | varchar(6) |  |  |

## Facts\_TO\_Terminated

|  |  |  |  |
| --- | --- | --- | --- |
| Column | Data Type | Source | Example |
| Employee Number | int |  |  |
| Employee Name | varchar(50) |  |  |
| Department Number | int |  |  |
| Employment Type | varchar(20) |  |  |
| Employee Start Date | datetime |  |  |
| Employee Termination Date | datetime |  |  |
| Financial Year | int |  |  |
| Pay Cycle | int |  |  |
| Pay Period | varchar(2) |  |  |
| Pay Period Id | varchar(6) |  |  |

# Moving Forward

## Getting Assistance

If you require any further information or clarification of the information contained within this document, you can contact WARDY IT Solutions through the following ways:

Phone: 1300 927 394

Fax: (07) 3856 5422

E-mail: [contact@wardyit.com](mailto:contact@wardyit.com)

1. Civica Local Government software, <https://www.civicalg.com.au/>. [↑](#footnote-ref-1)
2. Power BI Desktop, <https://powerbi.microsoft.com/en-us/desktop/>. [↑](#footnote-ref-2)