Data Wrangling using Power BI Desktop

Phil Robinson
Email: sqldbdev@gmail.com
Blog: sqldbdev.com
LinkedIn: linkedin.com/in/sqldbdev

Data Wrangling using Power BI Desktop

- Independent MS Consultant since 1997
- ASP/ASP.NET
- Current focus is Business Intelligence development using SQL Server tools.
- PASS Regional Mentor – Southwest Region
- User Group Leader – SD SQL BI Group
- Co-founder - SQL Saturday – San Diego

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Agenda

- Microsoft Business Intelligence Roadmap
- What is Data Wrangling ?
- Working with Data
- Data Governance
- Tools
- Resources

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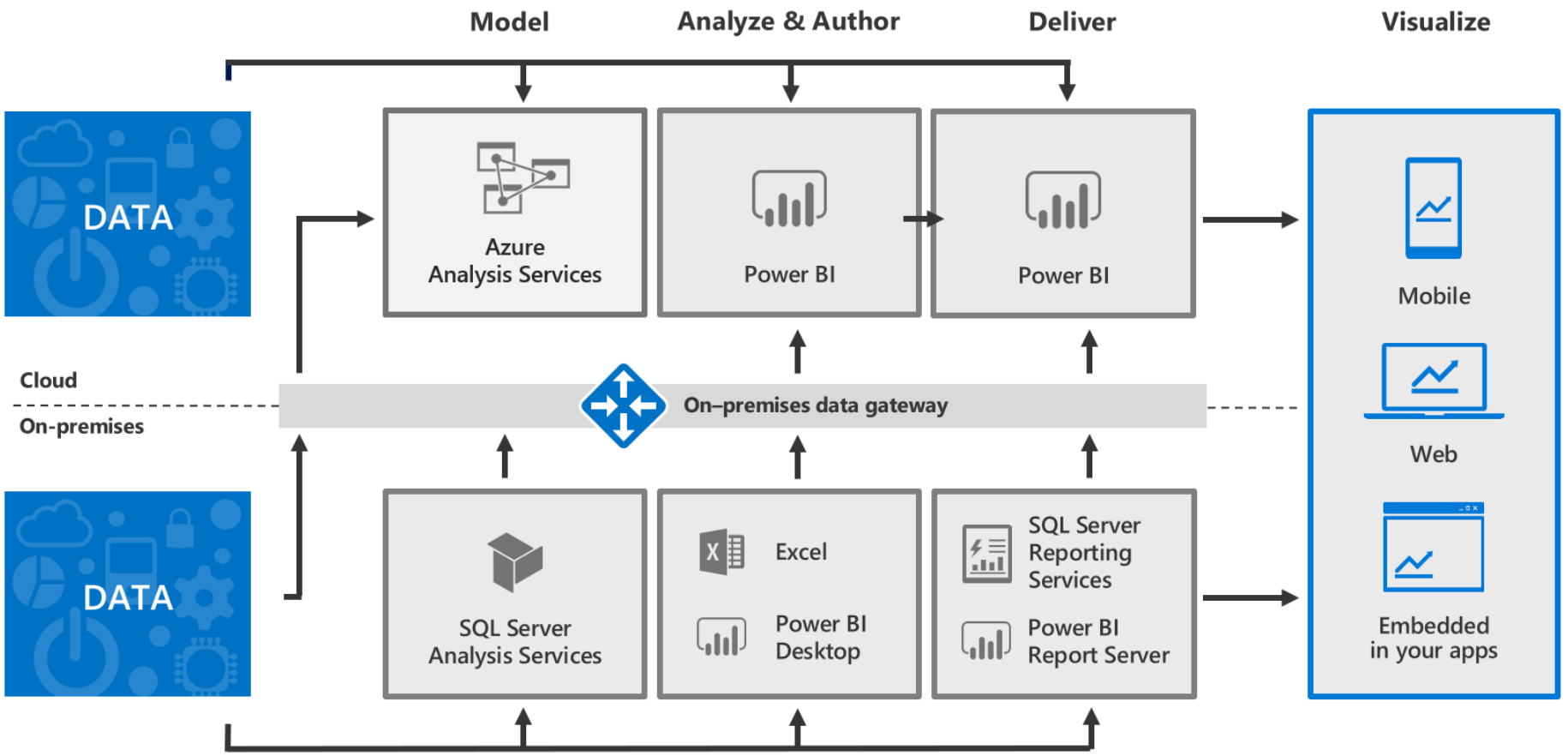

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What is Data Wrangling ?

- Wikipedia

  Data wrangling is the process of taking data in its native format & making it usable for analysis.

  A data wrangler is the person performing the wrangling. In the scientific research context, the term often refers to a person responsible for gathering and organizing disparate data sets collected by many different investigators, often as part of a field campaign.

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What is Data Wrangling ?

- Gartner

  Data preparation is an iterative-agile process for exploring, combining, cleaning and transforming raw data into curated datasets for self-service data integration, data science, data discovery, and BI/analytics.

"Market Guide for Data Preparation" Gartner, December 2017

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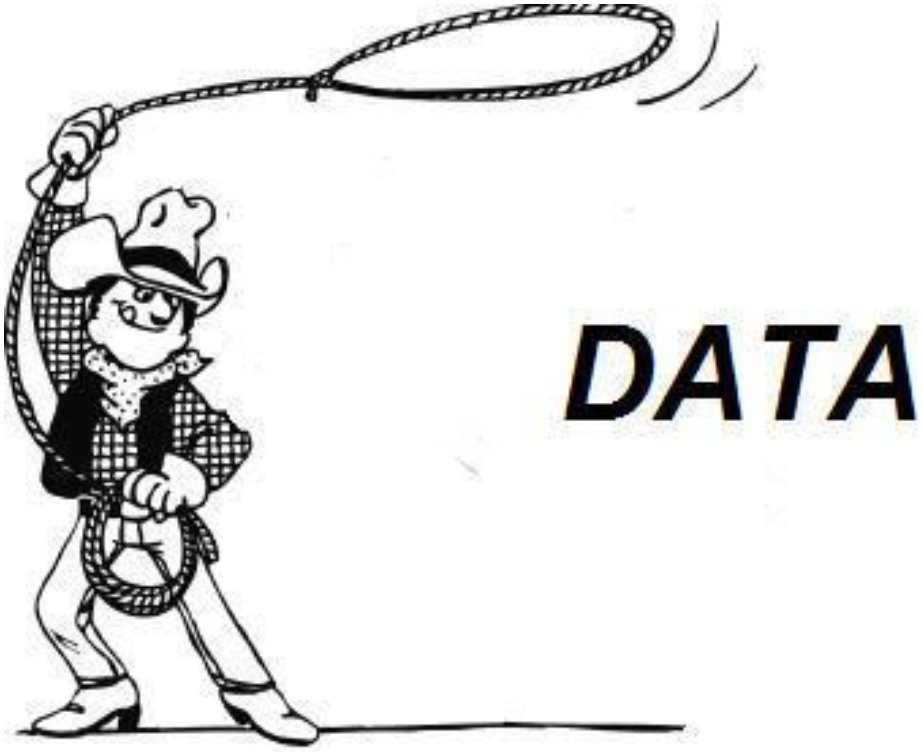

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Data preparation — the most time-consuming task in analytics and BI — is evolving from a self-service activity to an enterprise imperative.

By 2019, data and analytics organizations that provide agile, curated internal and external datasets for a range of content authors will realize twice the business benefits as those that do not.

“Market Guide for Data Preparation” Gartner, December 2017

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Percentage of time spent on data preparation by data scientists?

“Cleaning Big Data: Most Time-Consuming, Least Enjoyable Data Science Task, Survey Says”
Gil Press , Forbes Contributor
Based on a CrowdFlower survey of 179 data scientists conducted in February and March of 2017.

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Percentage of time spent on data preparation by data scientists?

80%

“Cleaning Big Data: Most Time-Consuming, Least Enjoyable Data Science Task, Survey Says”
Gil Press , Forbes Contributor
Based on a CrowdFlower survey of 179 data scientists conducted in February and March of 2017.

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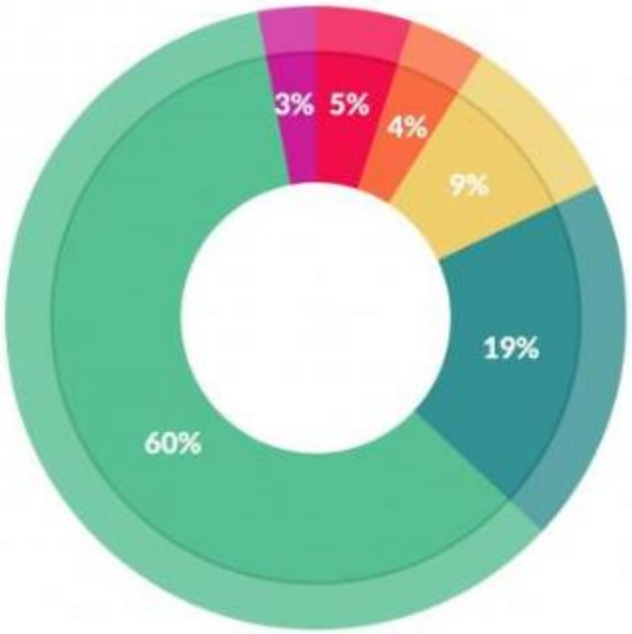
Data preparation *accounts for about 80% of the work of data scientists*



What data scientists spend the most time doing

- *Building training sets: 3%*
- *Cleaning and organizing data: 60%*
- *Collecting data sets; 19%*
- *Mining data for patterns: 9%*
- *Refining algorithms: 4%*
- *Other: 5%*

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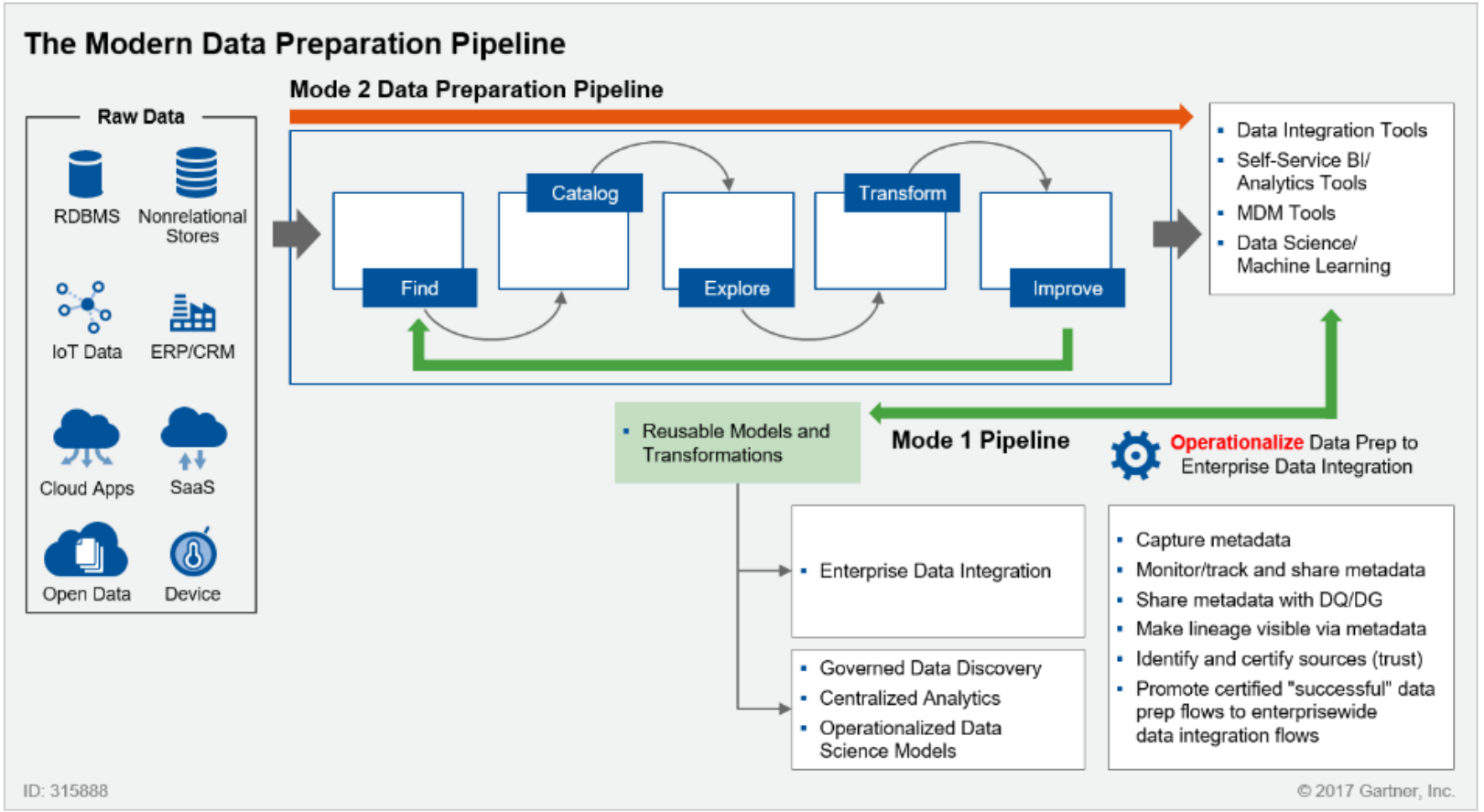

"Market Guide for Data Preparation" Gartner, December 2017

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Data Wrangling Steps

- Find

  Discovery of data that may be useful in answering the business question associated with the project.

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Data Source Challenges

- Diverse/Disparate
- Source reliability
- Update Frequency

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Data Wrangling Steps

- Catalog
  - Identify the data set source
  - Determine trustworthiness of source
  - Capture metadata

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Data Governance

- Data Source Trust Documentation
- Data Set Metadata Descriptions
- Transformation Process Details
  - Naming Conventions
    - ColumnName_Function_Description/Details

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CSVEasy

Catalog Data

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Data Wrangling Steps

- Explore
  - Check for data quality and consistency
  - Remove or repair data that might distort the analysis or report

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Dirty Data Challenges

- Corrupt Fields or Records
- Missing or Incorrect Values
- FUBAR Formats
- High Cardinality Columns

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Fixing Dirty Data

- Corrupt Fields or Records
  - Reload the data from the original source
  - Delete corrupt records
  - Treat corrupt columns as incorrect values

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Fixing Dirty Data

- Missing or incorrect values
  - Predict the missing value
  - Leave the record as is
  - Delete the record
  - Replace with the mean or median value
  - Create a new category
  - Introduce a new variable/column

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Fixing Dirty Data

- Missing or incorrect values
  - Nulls, Spaces, Special characters
  - Inconsistent format or value

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Fixing Dirty Data

- Missing or incorrect values
  - Gender
    - Invalid characters
    - Blank or U
      - Suffix – Sr, Jr, II, III
      - Prefix – Mr, Mrs, Miss, Ms

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Fixing Dirty Data

- Missing or incorrect values
  - Text formatting, abbreviations and case
    - "123-45-6789" or "123456780" or "123 45 6789“
    - "IBM" or "I.B.M." or "Int. Bus. Machines"
    - “VISTA” or “Vista” or “vista”

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Fixing Dirty Data

- FUBAR
  - Multiple value columns
    - “123 Any Street, San Diego CA 91901”
    - “537 Some Ave, Apt 301, San Diego CA 91901”
    - “537 Some Ave Apt 222, San Diego CA 91901”

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Fixing Dirty Data

- High cardinality columns
  - Address columns
  - Date columns

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CSVEasy/MultiEdit
Data Exploration

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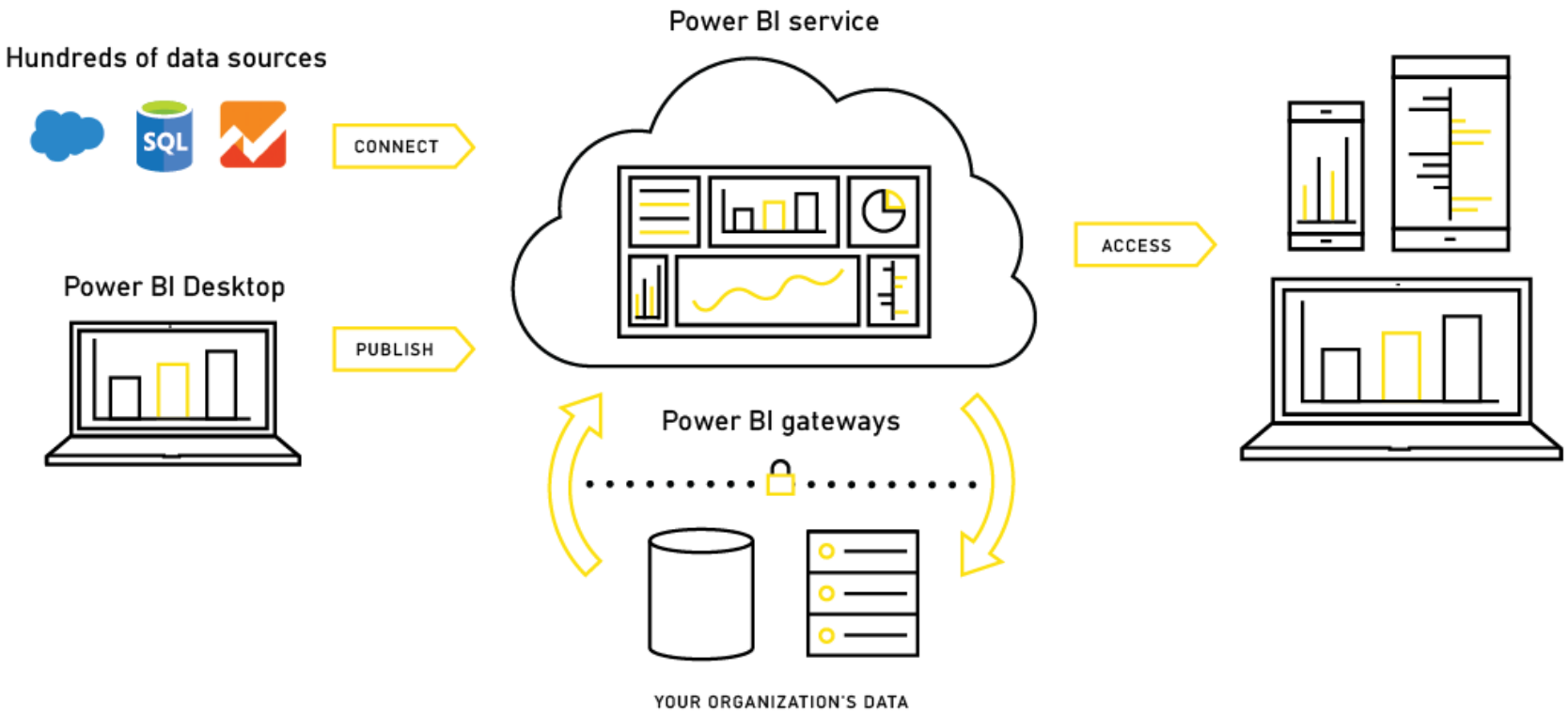

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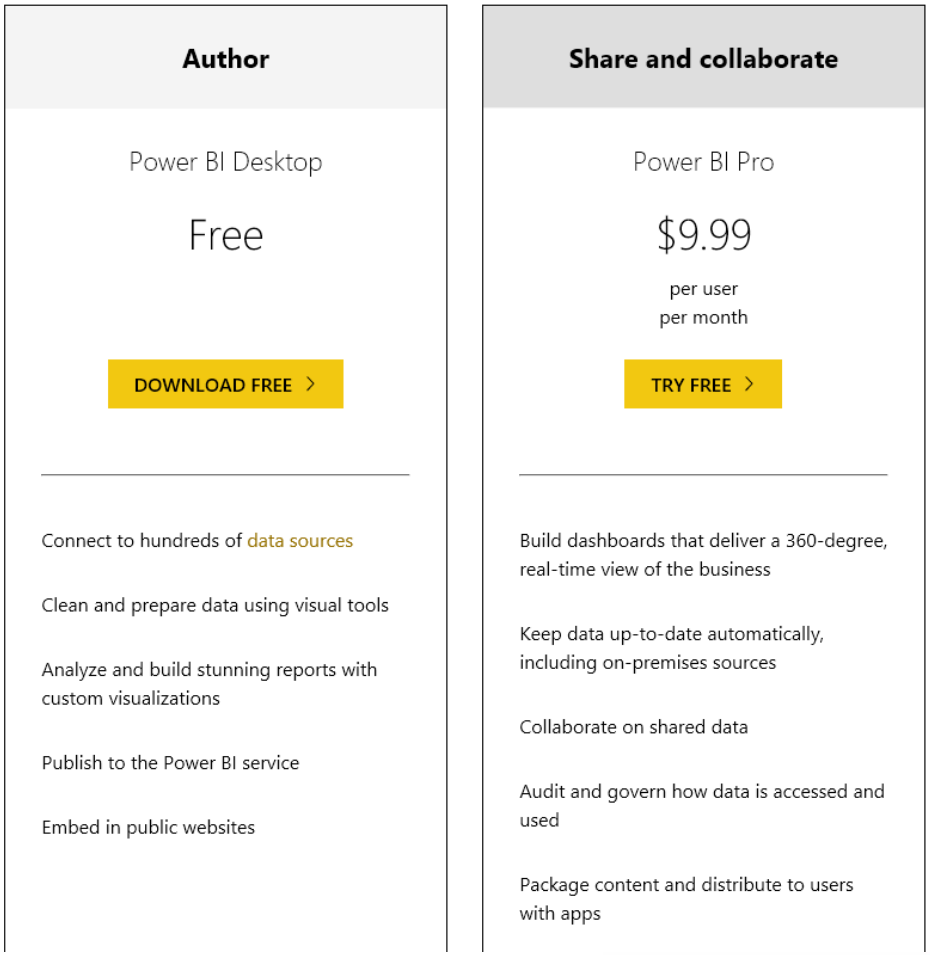

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Power BI
Data Exploration

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Data Wrangling Steps

- Transform
  - Fix or remove dirty data
  - Remove, split or combine columns
  - Join or pivot datasets

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Power BI
Data Transformation

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Data Wrangling Steps

- Improve
  - Identify and add other data which might be useful in this analysis
  - Can additional data be derived from the existing data

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Power Query
The M Language

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Tools

- CSVEasy
  - http://csveasy.com
- Multi-Edit Lite 2008
  - http://multieditsoftware.com/product/multi-edit-lite-2008

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Tools

- Power BI Desktop
  - https://powerbi.microsoft.com/en-us/desktop
- Power BI in the Cloud
  - https://powerbi.microsoft.com/en-us/pricing

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Resources

- Power Query (M) Formula Reference
  - https://msdn.microsoft.com/en-us/library/mt211003.aspx
- Chris Webb's BI Blog
  - https://blog.crossjoin.co.uk
- Melissa Coats - SQL Chick Blog
  - https://www.sqlchick.com/entries/2011/5/7/documenting-a-reporting-project.html

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Resources

- SQL Server 2017 – Developer Edition
  - https://www.microsoft.com/en-us/sql-server/sql-server-downloads

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