

Deploy Power BI as Code.

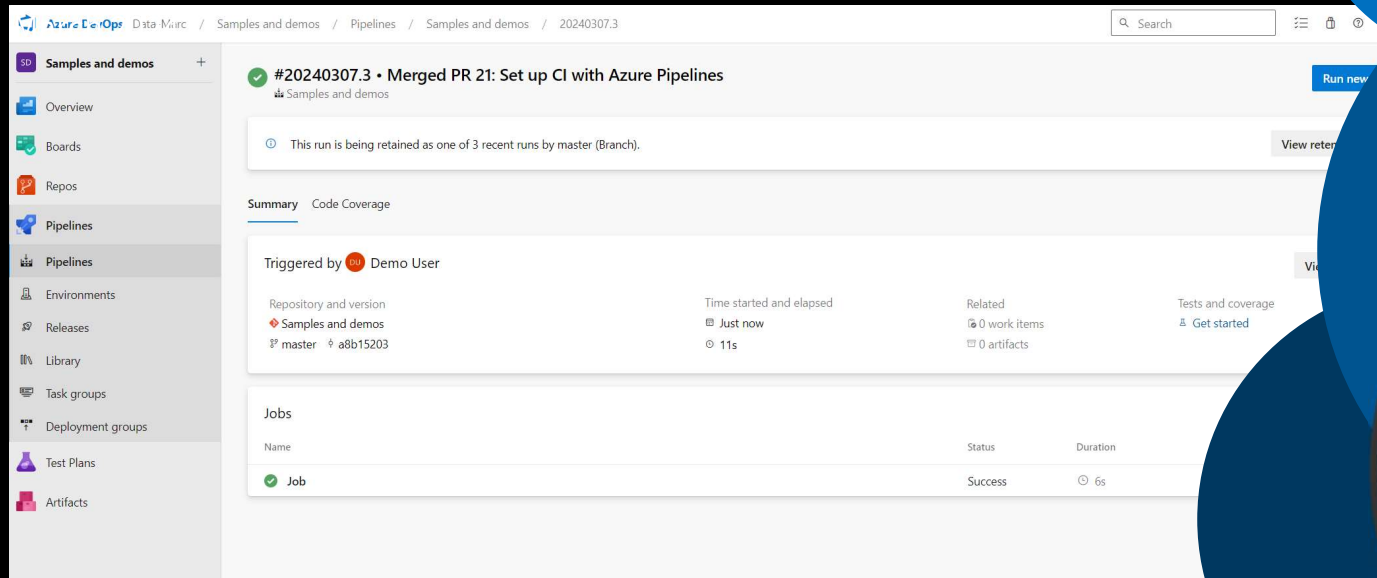
Professionalizing your solution using Power BI Project Files
and Git integration

March 2024



Deploy Power BI as Code.

Professionalizing your solution using Power BI Project Files and Git integration.



The screenshot displays the Azure DevOps web interface. The left sidebar shows the navigation menu with 'Samples and demos' selected. The main content area shows a pipeline run summary for '#20240307.3 • Merged PR 21: Set up CI with Azure Pipelines'. The run status is 'Success' (green checkmark). Below the summary, there is a table of jobs.

Jobs			
Name	Status	Duration	
Job	Success	6s	





- Marc: in



- Pau



- Paulien: aanpassen slide deck -> alle onrelevante troep eruit

Demo:

- .pbip structuur, hoe maak je die, wat veranderen in code en desktop
- uitleg branching + laten zien in azure devops / visual studio code
- opzetten git integration in Power BI service + deployment pipeline + azure devops pipeline
- daarna verandering + pull request + deployment
- samenwerken

Why did we come together?

- “With the recent changes of TMDL, Git Integration and the new file structure, we can now deploy Power BI as code without too much hassle!”
- “Step by step approach how to deploy your Power BI data model and other artifacts.”

About me

- Paulien van Eijk
- Gouda – Netherlands
- Data & Analytics consultant at Macaw
- Focus on Power BI, Fabric and Databricks
- powerbiprincess.com



powerbiprincess.com

Demo catalogus

Demo deployment pipeline:

- Deployment pipeline met drie stages
- Dataset al in test

Demo .pbip

- Power BI rapport met dataset met een klein aantal visuals en measures
- TMDL preview aan/uit

Demo branching

- Power BI rapport met dataset en klein aantal visualisaties
- visual studio code

Demo pull request en merging

- pull request klaar hebben staan als demo
- zelfde file wel ook om te bewerken.
- azure devops deployment via power bi deployment pipeline

Demo catalogus

Intro vragen enzo - Marc

Power BI deployment pipeline - Paulien

.pbip - Marc

Branching - Paulien

Merging + pull request - Marc

Integratie Power BI en Git – Paulien

Scenarios - Marc

Paulien van Eijk

Data & Analytics Consultant
Macaw Netherlands



linkedin.com/in/Paulien-van-Eijk



PowerBIPrincess.com

FAVORITE STUFF:



After this session

Challenges

Understand challenges working with multiple developers on the same Power BI solutions

File format

Understand the new file format .pbip and explain the advantages of new this file format

Git

Understand how Git can help taking version control and collaboration on your solutions to the next level

Deployment

Understand deployment patterns using the new file format and / or Git integration

Don't forget to submit your session feedback!

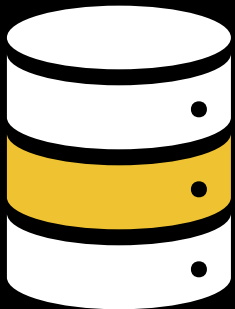




Report Development Cycle

Publishing your report online

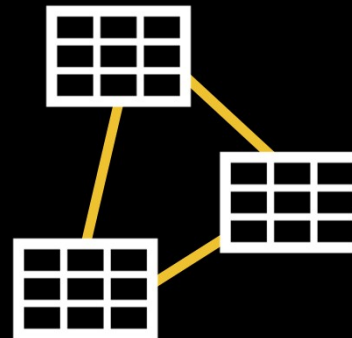
Gather



Clean



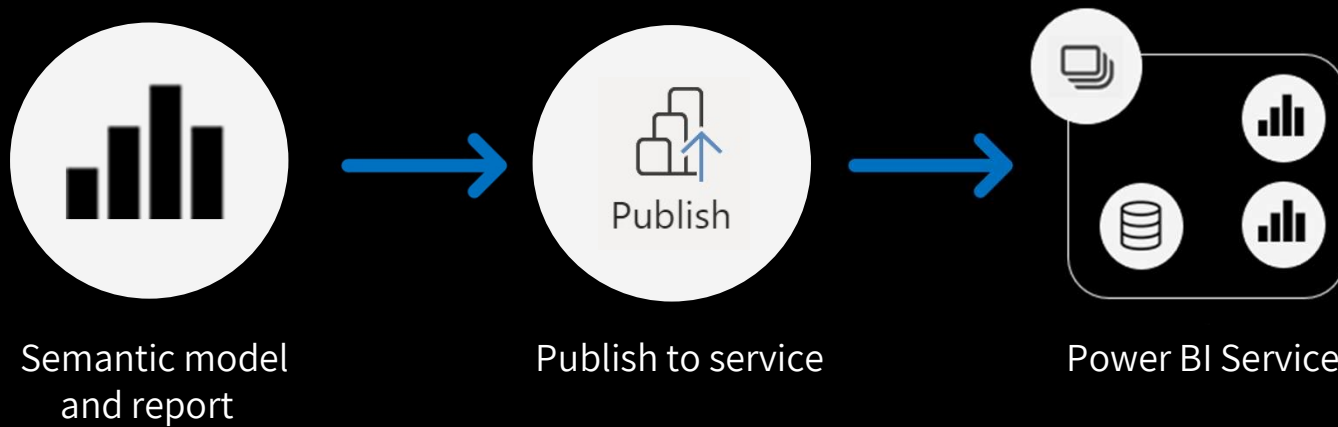
Model



Visualize



Publishing your report online





Who is using this development cycle as their way of work?

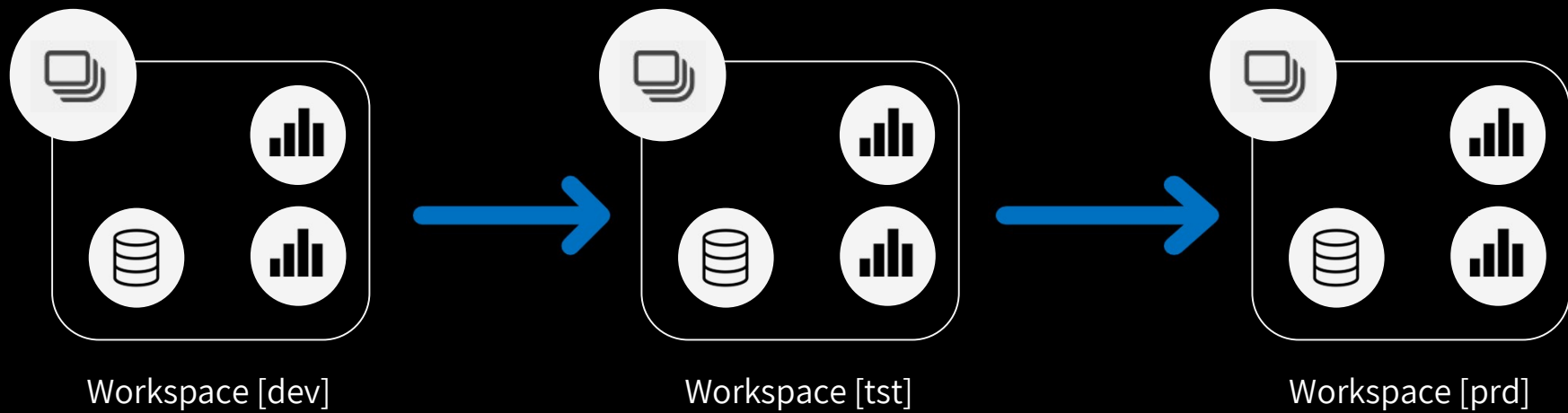


What are your experiences?

Things you might have encountered

- Collaboration is difficult
- Keeping track of changes is (almost) impossible
- Download report from service to get latest version
- Publishing a previous version

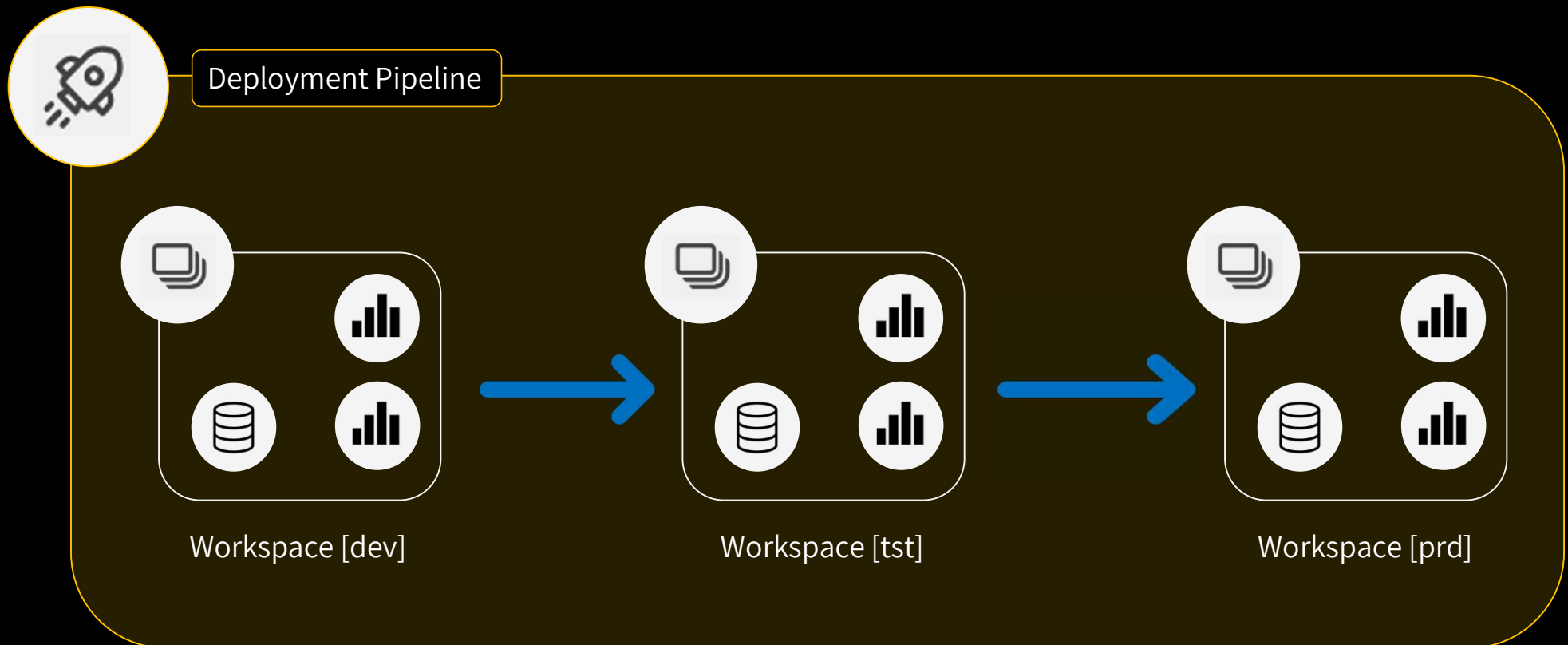
Working in stages (DTAP)



Things you might have encountered

- Accidentally publishing to production instead of development.. whoops
- Forgot to change data source connection from dev to prod
- Overwriting data in production

Things got a bit better



The background is black and features several blue circles of different sizes and shades. A large, solid blue circle is positioned in the upper right quadrant, containing the word "Demo" in white. To its left and below, there is a cluster of smaller circles, some solid and some outlined, in various shades of blue. In the bottom right corner, the text "powerbiprincess.com" is written in a small, white, sans-serif font.

Demo

What improved / can be avoided?

- Collaboration is difficult
- Keeping track of changes is (almost) impossible
- Download report from service to get latest version
- Publishing a previous version

When using DTAP:

- Accidentally deploying to production instead of development.. whoops
- Forgot to change data source connection from dev to prod
- Overwriting data in production



New file format: .pbip

New file format: .pbip

- Power BI Project file
- Saving [report](#) and [semantic model](#) artifacts in separate plain text files in a clear folder structure
- Still in preview (already since June 2023)

New semantic model file format: TMDL

- Tabular Model Definition Language
- Folder structure with separate files for each table, perspective, role and culture
- In preview since February 2024



Why should we care?

Enables capabilities, such as:

- Editable format: Easily make changes using code editors Pv0
- Source Control: Track version history, compare versions, revert to previous versions
- CI / CD: Make changes to code that are automatically tested and pushed out for delivery and deployment.

Slide 26

Pv0

[@Marc Lelijveld] initialize jij hier ook al een git repository, of laat je het alleen lokaalz ien?

Paulien van Eijk; 2024-02-16T15:47:19.630

Demo



Slide 27

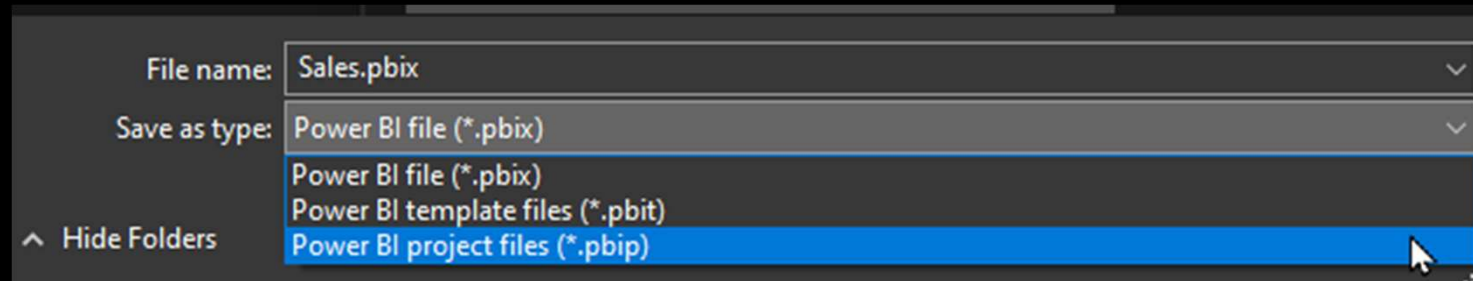
Pv0

Laat jij in de .pbip demo dan ook TMDL zien?







Paulien van Eijk; 2024-02-27T12:49:49.253

Editable format:

- Save as .pbip with “File” > “Save as”



- When we open this project, we see the following:

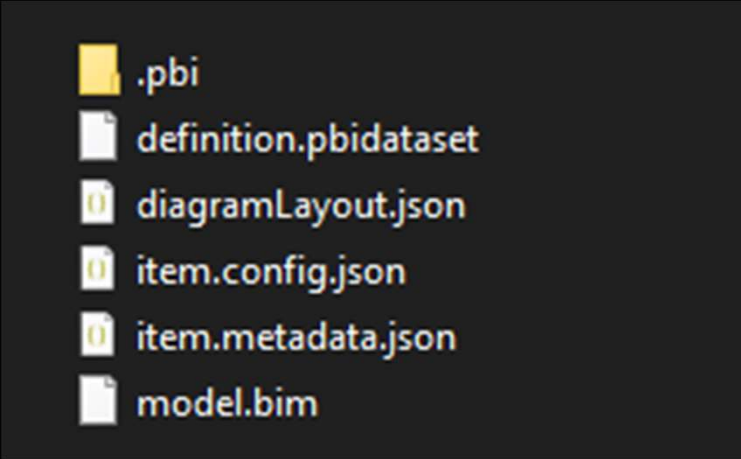
 Sales.Dataset		09-8-2023 14:16	File folder	
 Sales.Report		09-8-2023 14:16	File folder	
 .gitignore		09-8-2023 14:16	Text Document	1 KB
 Sales.pbip		09-8-2023 14:16	Microsoft.Microso...	1 KB

Editable format:

- **Sales.Dataset:** Represents the Power BI dataset in folders and subfolders
- **Sales.Report:** Represents the Power BI report in folders and subfolders
- **.gitignore:** Untracked files Git should ignore.
 - Local settings and cache
- **Sales.pbip:** Just a pointer to a report folder

Sales.Dataset

- **Model.bim:** contains the TMSL database object definition of the model
- **Item.config.json:** Identifies the folder as a source control representation of a service item.
- **Item.metadata.json:** Contains attributes that define the item
- All components are explained [here](#)



```
.pbi
definition.pbidataset
diagramLayout.json
item.config.json
item.metadata.json
model.bim
```


Slide 30

MLO

Zullen we deze slides er gewoon in houden als uitleg? Zelfde voor de Sales.Report?

Marc Lelijveld; 2024-02-06T06:53:20.438

Steps

- Open Visual Studio Code (or other code editor)
- Open parent folder with all the elements of the Power BI project file

✓ **DEPLOY POWER BI AS CODE**

> Sales.Dataset

> Sales.Report

📄 .gitignore

☰ Sales.pbip

Steps

- Add the following measure to the model.bim file:

```
,
```

```
{
```

```
  "name": "# Sales",
```

```
  "expression": "sum(Sales[Units])",
```

```
  "formatString": "0",
```

```
  "lineageTag": "0e8363af-ecb5-486e-8346-774907340821"
```

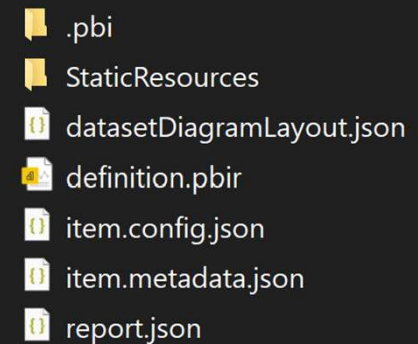
```
}
```

Steps

- Open the .pbip file (not the .pbix file!)
- The measure appeared
- Remove the measure from the Power BI Desktop file
- Save
- Refresh Visual Studio Code
- The measure disappeared also in Visual Studio Code.

Sales.Report

- **Definition.pbir:** Contains the overall definition of the report and the referenced dataset.
- **report.json:** Defines a report including visuals, page layout, and intended interactions
- **Item.config.json:** Identifies the folder as a source control representation of a service item.
- **Item.metadata.json:** Contains attributes that define the item
- All components are explained [here](#)



```
.pbi
StaticResources
datasetDiagramLayout.json
definition.pbir
item.config.json
item.metadata.json
report.json
```

Steps

- Open the report.json in de Visual Studio Code
 - Adjust the font size in the card
 - Open the .pbip file
 - The value in the card is now very small
-
- This is officially not supported.. But possible
 - Not sure what the future will hold, but hopefully something more editable 😊


How do we enable the other benefits?

- Editable format: Easily make changes using code editors
- Source Control: Track version history, compare versions, revert to previous versions
- CI / CD: Make changes to code that are automatically tested and pushed out for delivery and deployment.




Source Control

Is there a better way of versioning than..


 Sales.pbix

Is there a better way of versioning than..



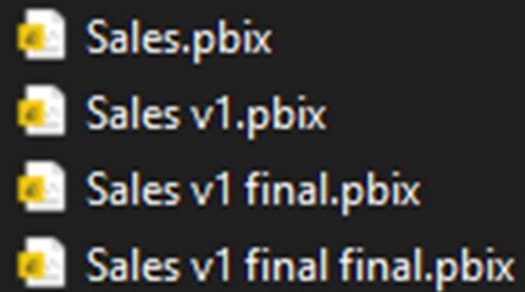
Sales.pbix
Sales v1.pbix





Is there a better way of versioning than..



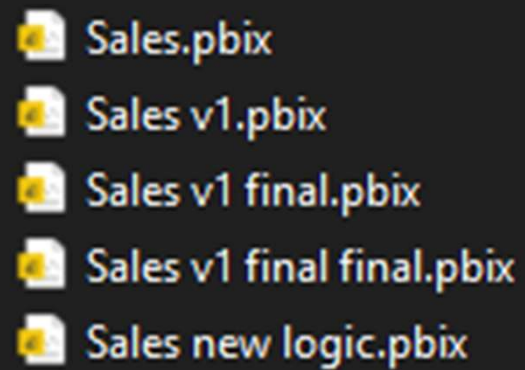
- Sales.pbix
- Sales v1.pbix
- Sales v1 final.pbix

Is there a better way of versioning than..



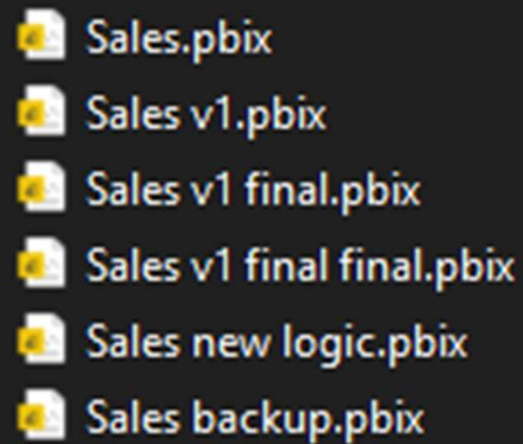
-  Sales.pbix
-  Sales v1.pbix
-  Sales v1 final.pbix
-  Sales v1 final final.pbix

Is there a better way of versioning than..



- Sales.pbix
- Sales v1.pbix
- Sales v1 final.pbix
- Sales v1 final final.pbix
- Sales new logic.pbix

Is there a better way of versioning than..



- Sales.pbix
- Sales v1.pbix
- Sales v1 final.pbix
- Sales v1 final final.pbix
- Sales new logic.pbix
- Sales backup.pbix

Options

- SharePoint
- OneDrive

But only track the binary file as a whole. So, we don't know;

- When we deleted that one table?
- When we introduced that issue in our measure...
- Etcetera.

But we are talking about ‘professionalizing’ –
so let’s take it to the next level...

GIT ALL THE WAY!!





Who has used Git before?

Git, what is it?

Git is a version control system to **track and manage changes**

It provides functionalities for:

- Version control
- Collaboration
- Tracking changes
- Compare versions

But how?



Branching

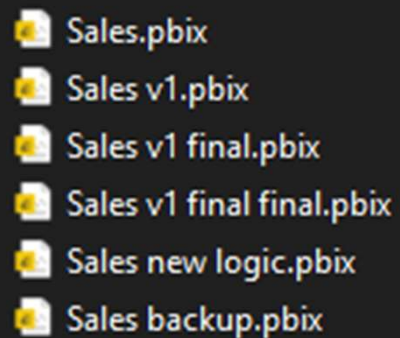


Merging

Branching – General concept

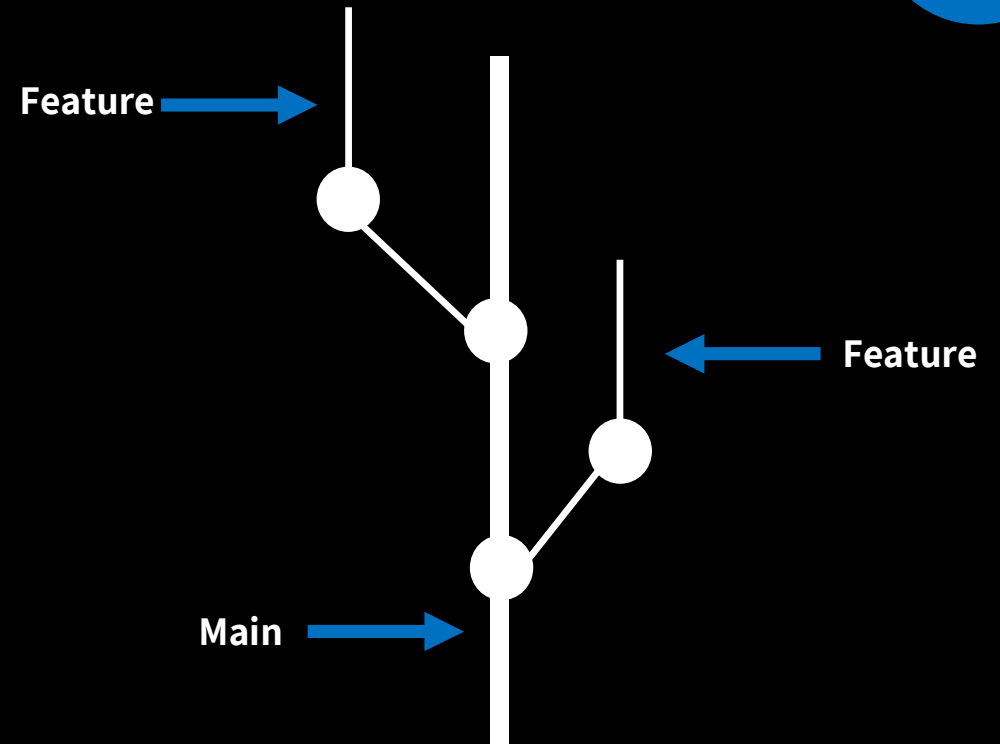
- Isolate development workflow
- Safely create new feature / fix bug
- Copy of code, without modifying “production”,
- Test before saving to “production”

- Without the need for:



- Sales.pbix
- Sales v1.pbix
- Sales v1 final.pbix
- Sales v1 final final.pbix
- Sales new logic.pbix
- Sales backup.pbix

But how?



The background is black and features several blue circles of different sizes and shades. A large, solid blue circle is positioned in the upper right quadrant. To its left, there is a white outline of a circle. Below these, a cluster of smaller blue circles in various shades (light blue, medium blue, dark blue) is arranged in a diagonal pattern towards the bottom left. In the bottom right corner, the text 'powerbiprincess.com' is written in a small, white, sans-serif font.

Demo

Use Git locally

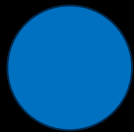
- Create local repository
- Create .pbix and publish it to the local repository
- Create changes and commit changes
- Show that you can see all the different steps you took
- Show that you can compare



**Who is familiar with the concept of
branching and merging?**

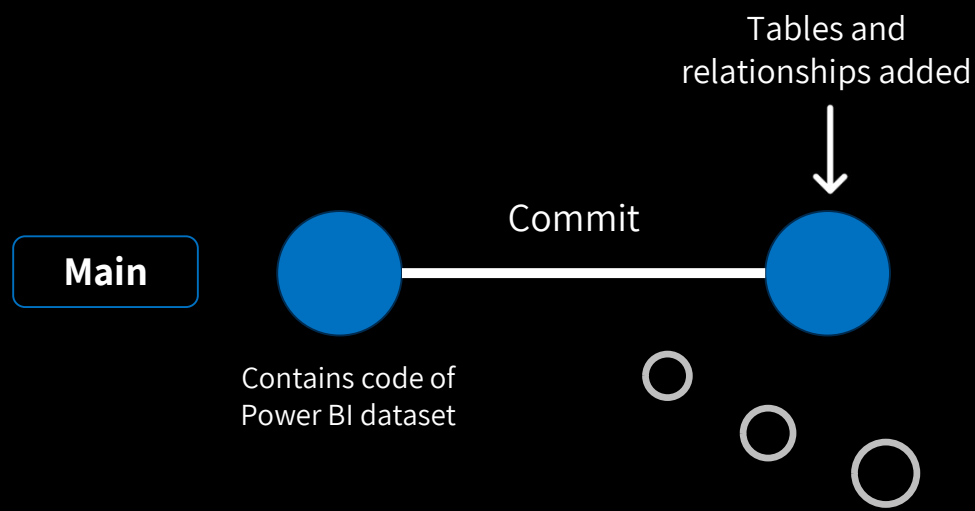
Branching

Main



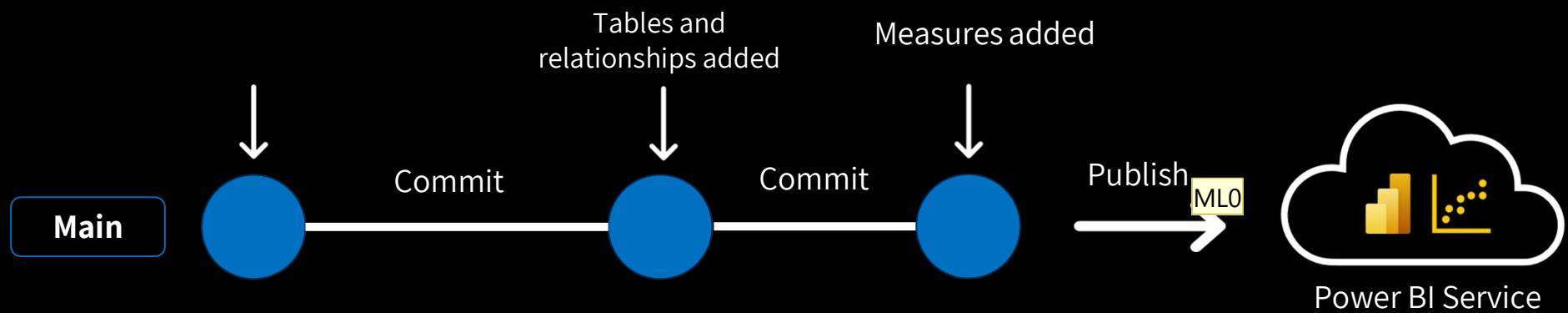
Contains code of
Power BI dataset

Branching



Commit: Creates snapshot of the repository. Committed snapshots are like clicking the “save” button in Power BI Desktop

Branching



Slide 56

MLO Willen we 'm echt publishen vanuit desktop? Waarom niet inchecken met code? 🤖

Marc Lelijveld; 2024-02-06T06:56:43.111

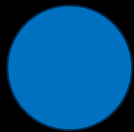
Pv0 0 Hiervoor hebben we nog niets over de git integratie uitgelegd in Power BI

Paulien van Eijk; 2024-02-06T13:36:49.019

Branching

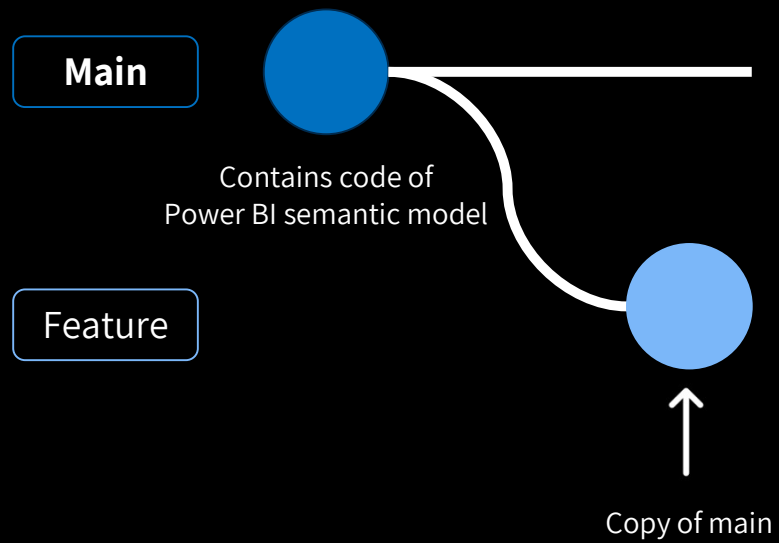


Main

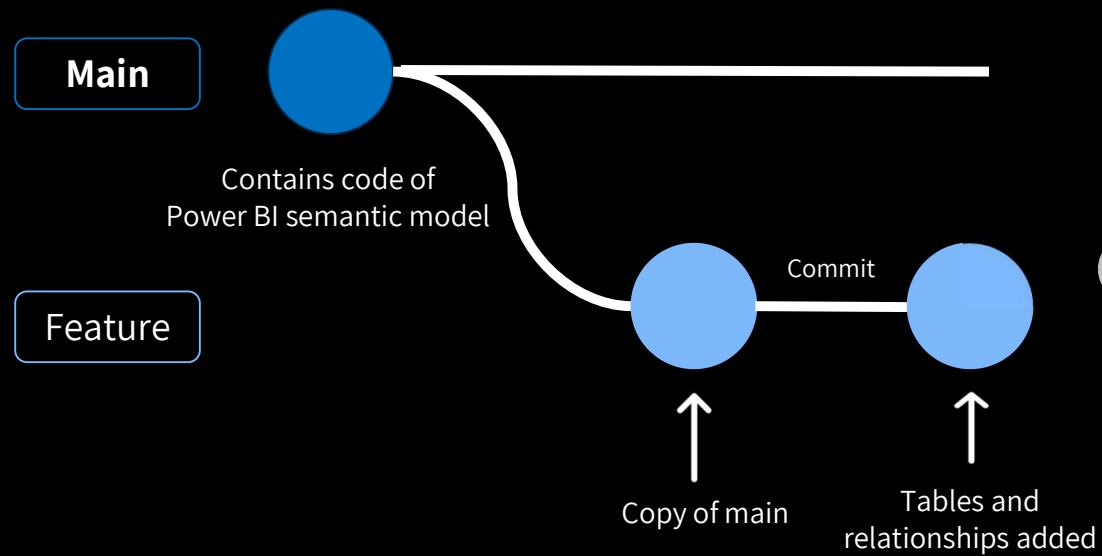


Contains code of Power
BI semantic model

Branching

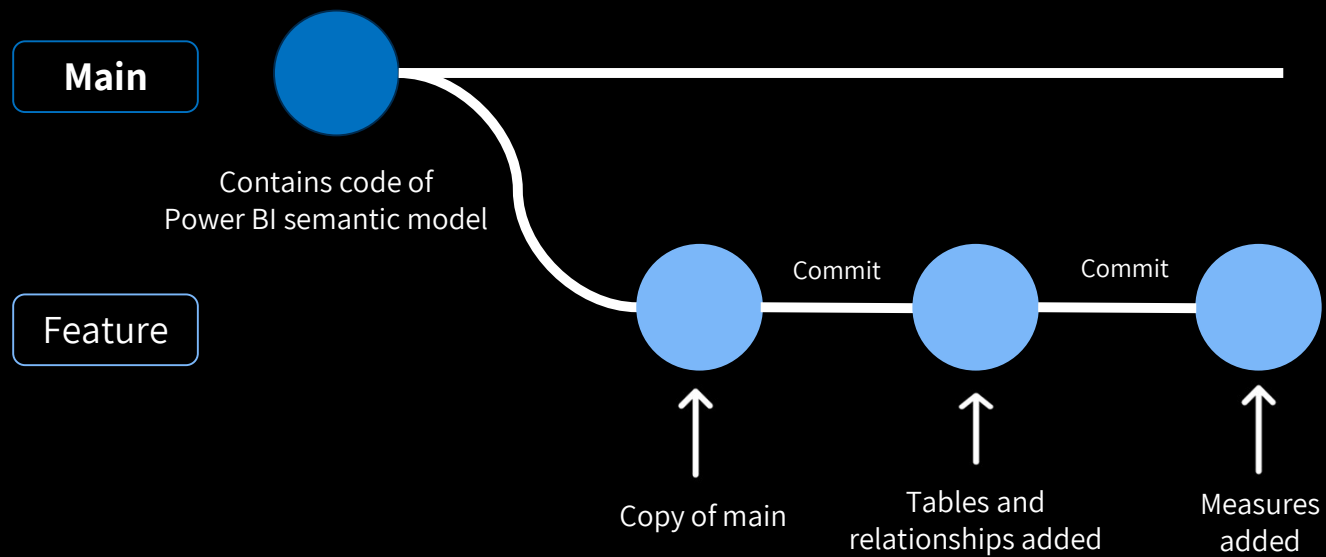


Branching



Commit: Creates snapshot of the repository. Committed snapshots are like clicking the “save” button in Power BI Desktop

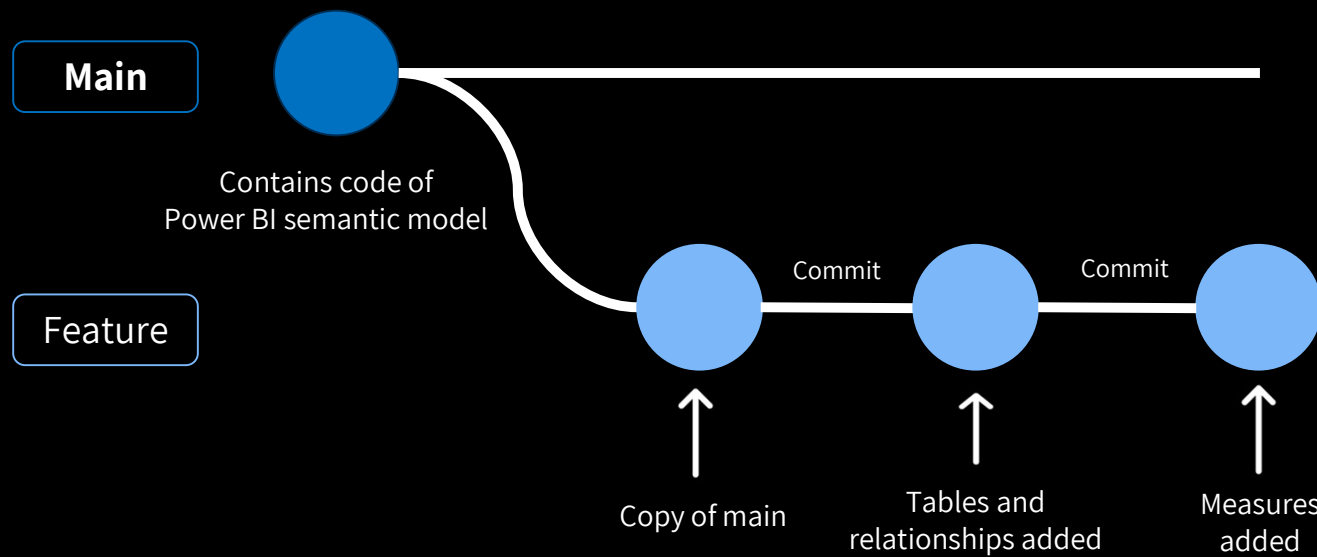
Branching



The background is black and features several blue circles of different sizes and shades. A large solid blue circle in the center contains the word "Demo". To its left is a white outline of a circle. Below these are several other solid blue circles of varying sizes, some in lighter and some in darker shades. In the bottom right corner, the text "powerbiprincess.com" is visible.

Demo

Branching

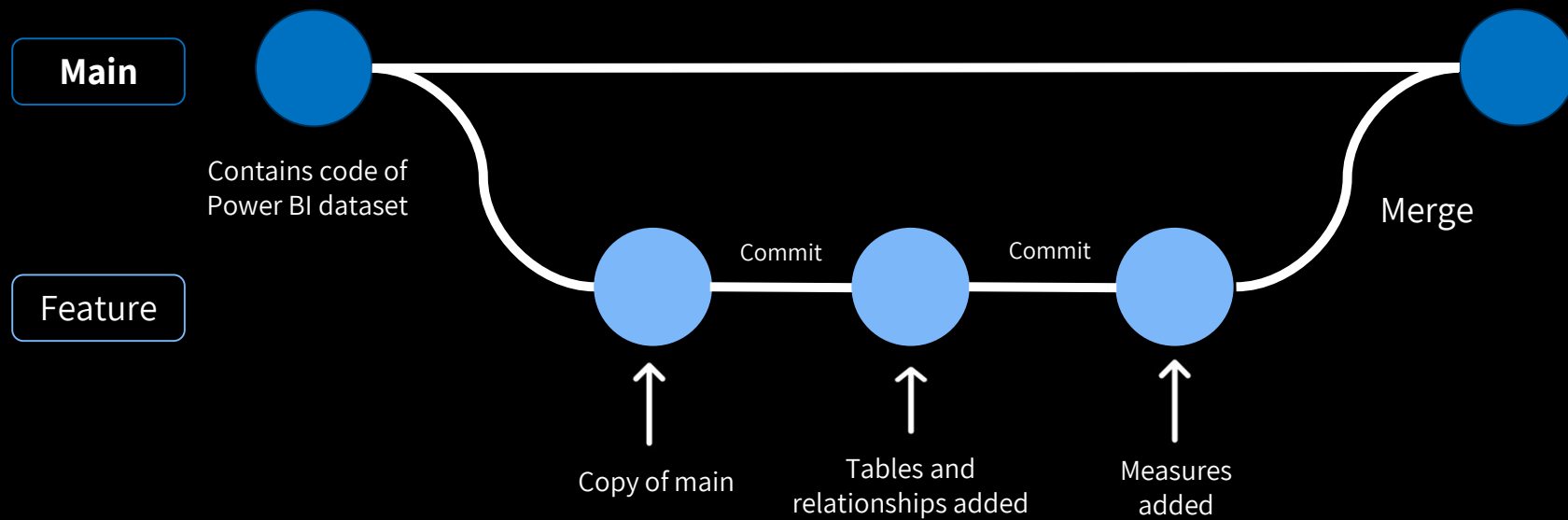


Done developing 😊
Now what?

Merging

- Take the main branch and the feature branch and create one single source of truth.

Merging

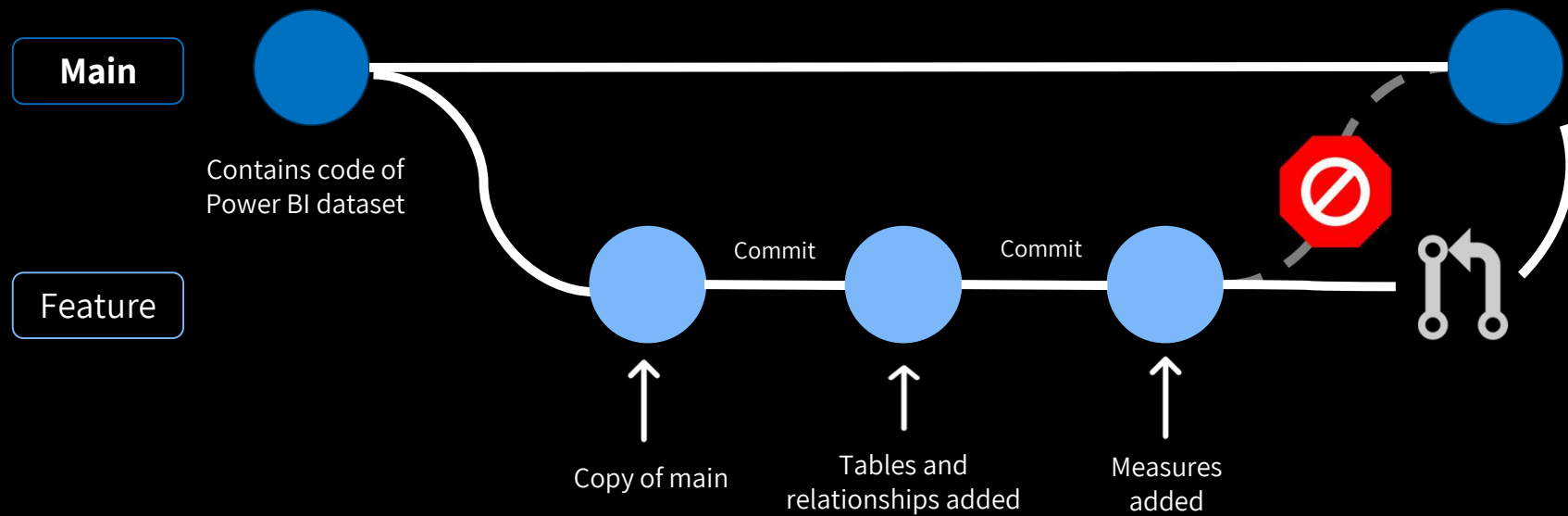




Considering main is our production environment...

Do we bring our changes directly to production?

Pull Request



Pull Request (PR)

Protect your main branch by defining branch policies. Nobody can directly commit to Main or approve their own work in a pull request.

With a PR, we enable:

- Validation of work
- 4-eye principle (or more)
- Test code as part of PR

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Demo

Wasn't this already possible?

- Yes! Branching and merging was already possible before. **MLO**
- But, it was in an unreadable file format, called .pbix.
- Dataset and reports were not separated → one big file
- Dataset contained data
 - Except if you separately upload a model.bim / xmla
- PBIX files are often too large (volume wise) which required Large File System (LFS) to be enabled on the repository → LFS = anti-pattern

Slide 69

MLO Uh? Hoe? Pbix is niet leesbaar en als je 'm uit elkaar trekt is die insupported
Marc Lelijveld; 2024-02-06T06:58:01.227

Pv0 0 Dat staat eronder 😊
Paulien van Eijk; 2024-02-06T13:37:13.418



or



Scenarios

Choices...

Solely versioning in Git

Git as your source control and versioning system – either locally or in the cloud

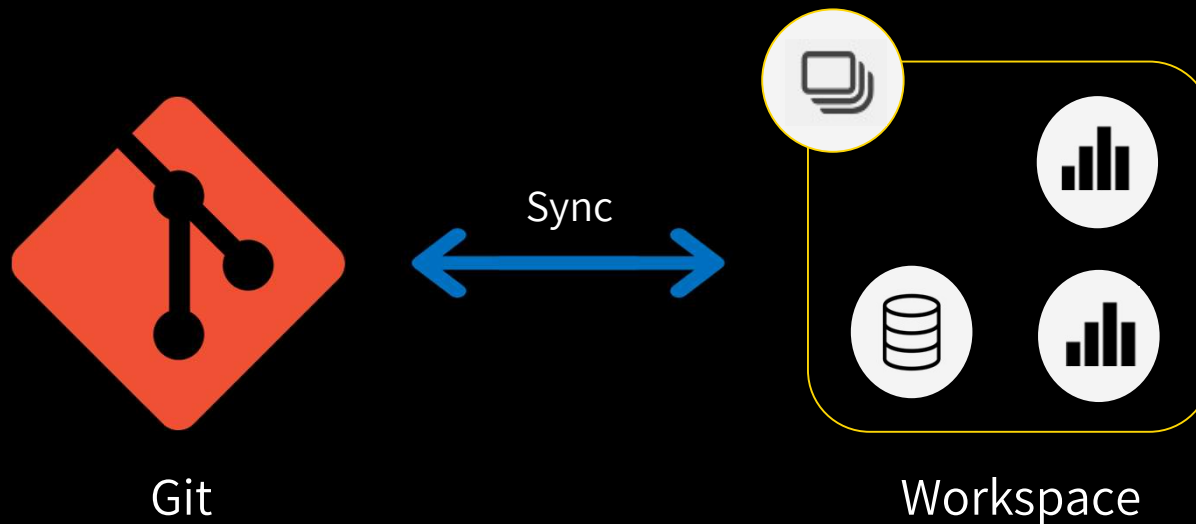


Connect Git to Power BI

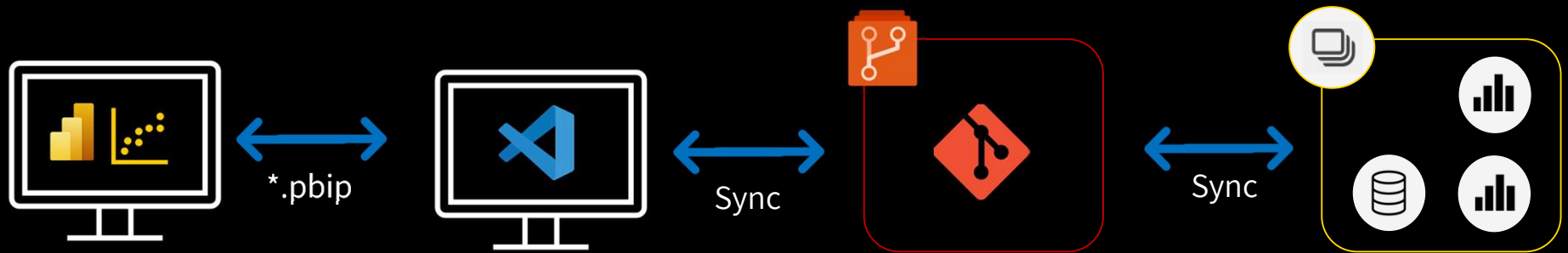
Git Integration **in Power BI service** with Azure DevOps as our source control and versioning system



Git Integration with Power BI



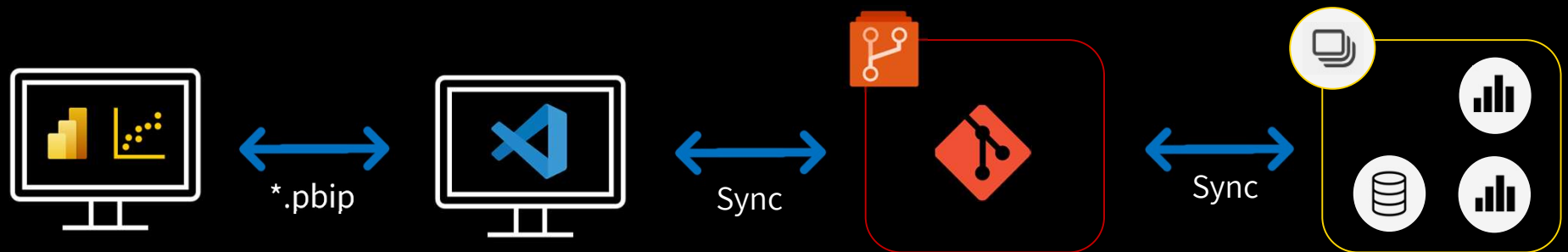
All together



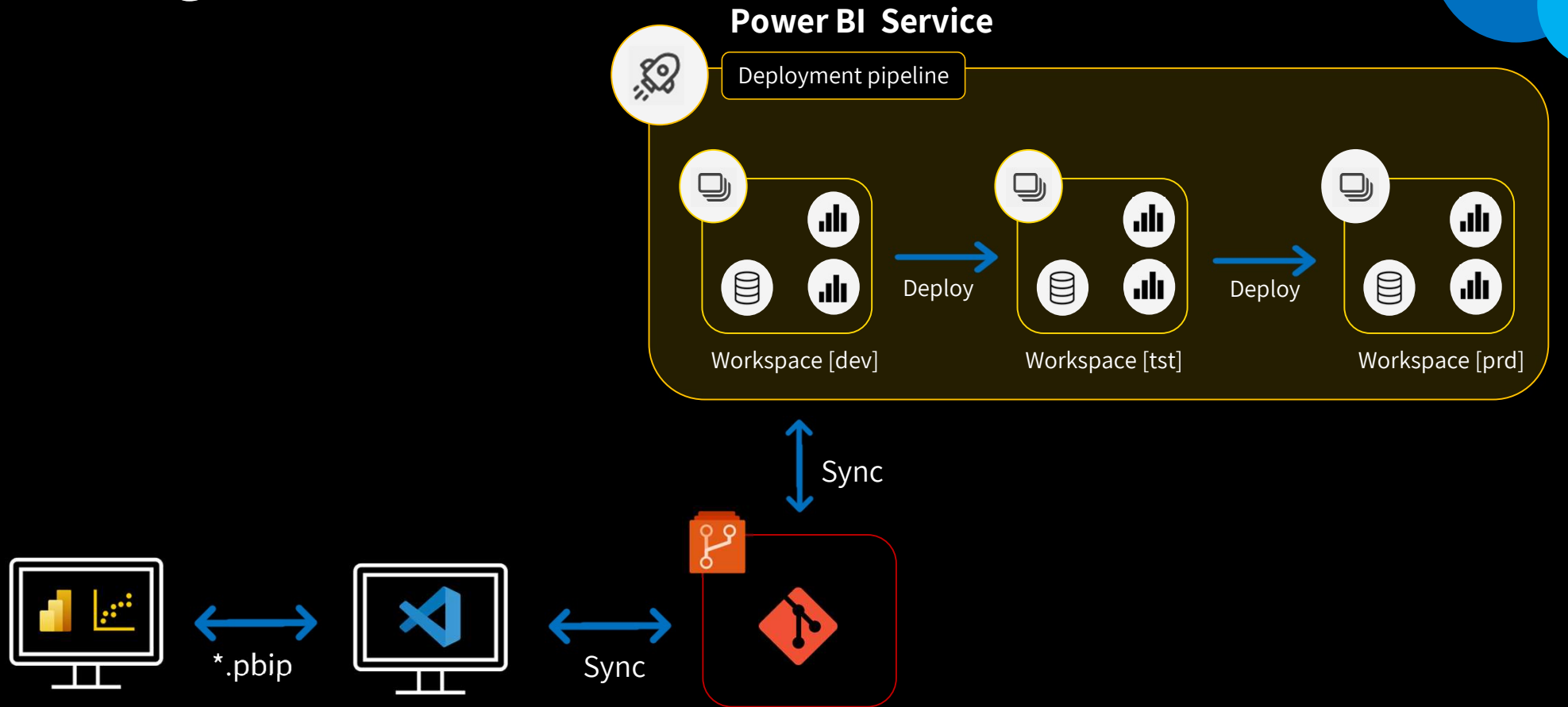
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Demo

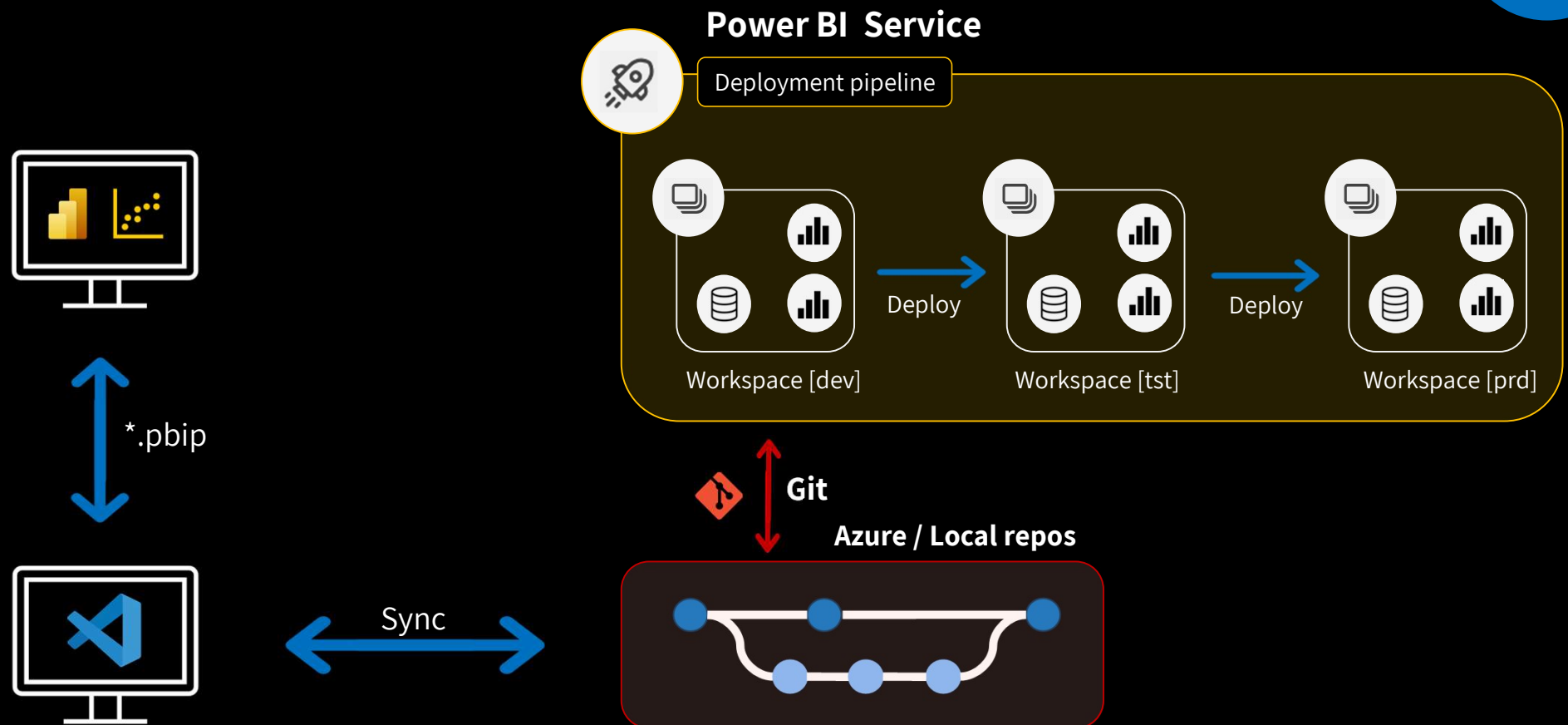
All together



All together



The Microsoft Intended way

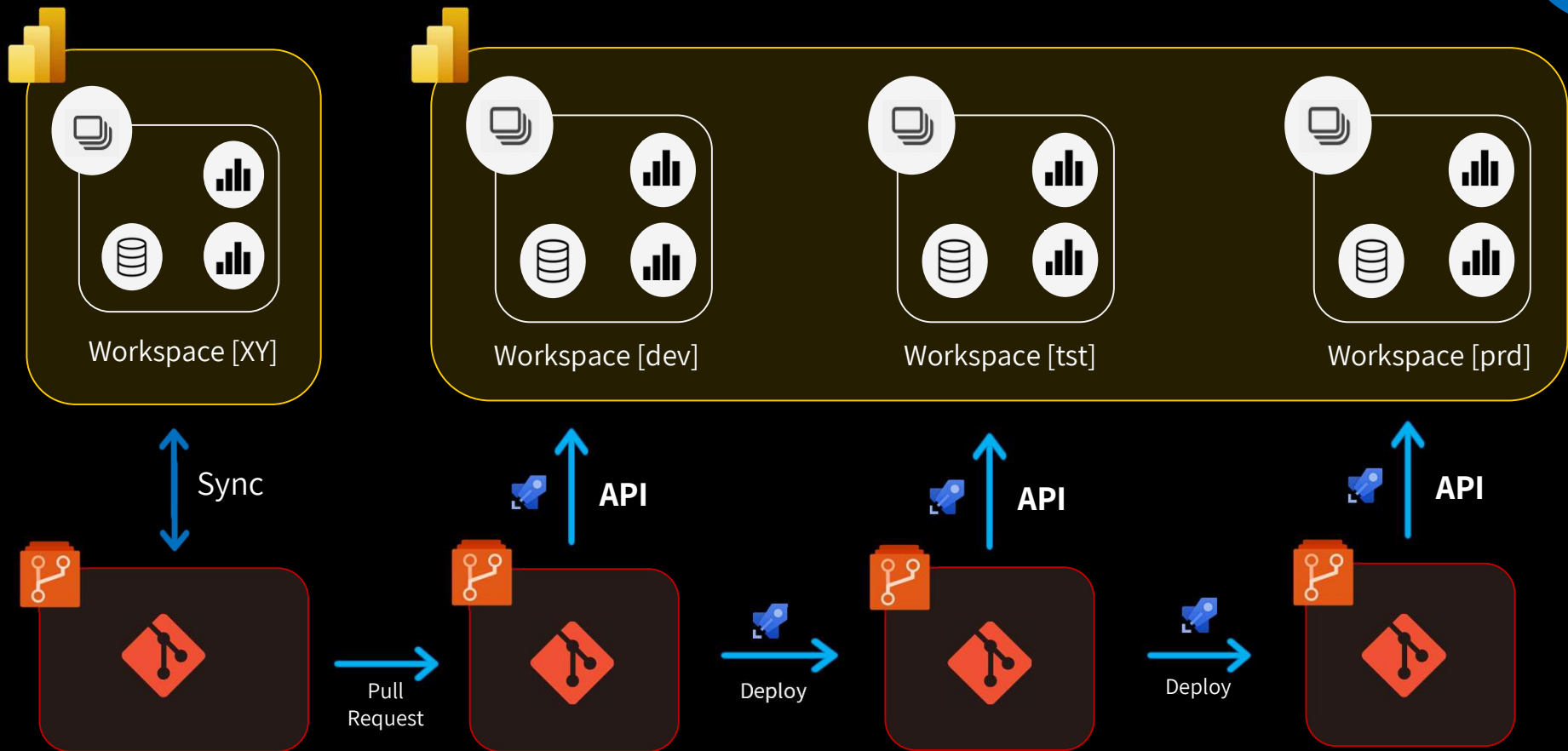


MLO

Deze even toegevoegd. Dit is hoe MSFT wilt dat we het gebruiken

Marc Lelijveld; 2024-02-06T07:10:01.807

All Together – Orchestration via Azure DevOps



Extension Devops Release Pipeline

Power BI Automation Tools:

<https://marketplace.visualstudio.com/items?itemName=ms-pbi-api.pbi-automation-tools>

The background is black and features a collection of blue circles in various sizes and shades, ranging from light blue to dark blue. Some circles are solid, while others are hollow outlines. They are scattered across the slide, with a higher concentration in the bottom-left and top-right corners. A large solid blue circle is positioned in the upper-middle section, containing the word "Demo".

Demo

Combine scenarios

- It's not as black or white as the solutions presented
- There are many ways to deviate from this design to make this way of work suitable for your organization.

Wrap up

With git integration, we get a **real developer experience** for Power BI solutions

Git allows to check in changes based on code and **track changes**

Choose the **best scenario** for your situation

Although it is not perfect (yet?) it has some **great potential** going forward

Setup your own playground/test environment to **get familiar** with the concepts

Q&A

