



**Power BI
Deployment
Pipelines**



Azure DevOps

Enterprise and multi-tier Power BI deployment with Azure DevOps

Aka. Application Lifecycle Management for Power BI



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[@MarcLelijveld](https://twitter.com/MarcLelijveld)



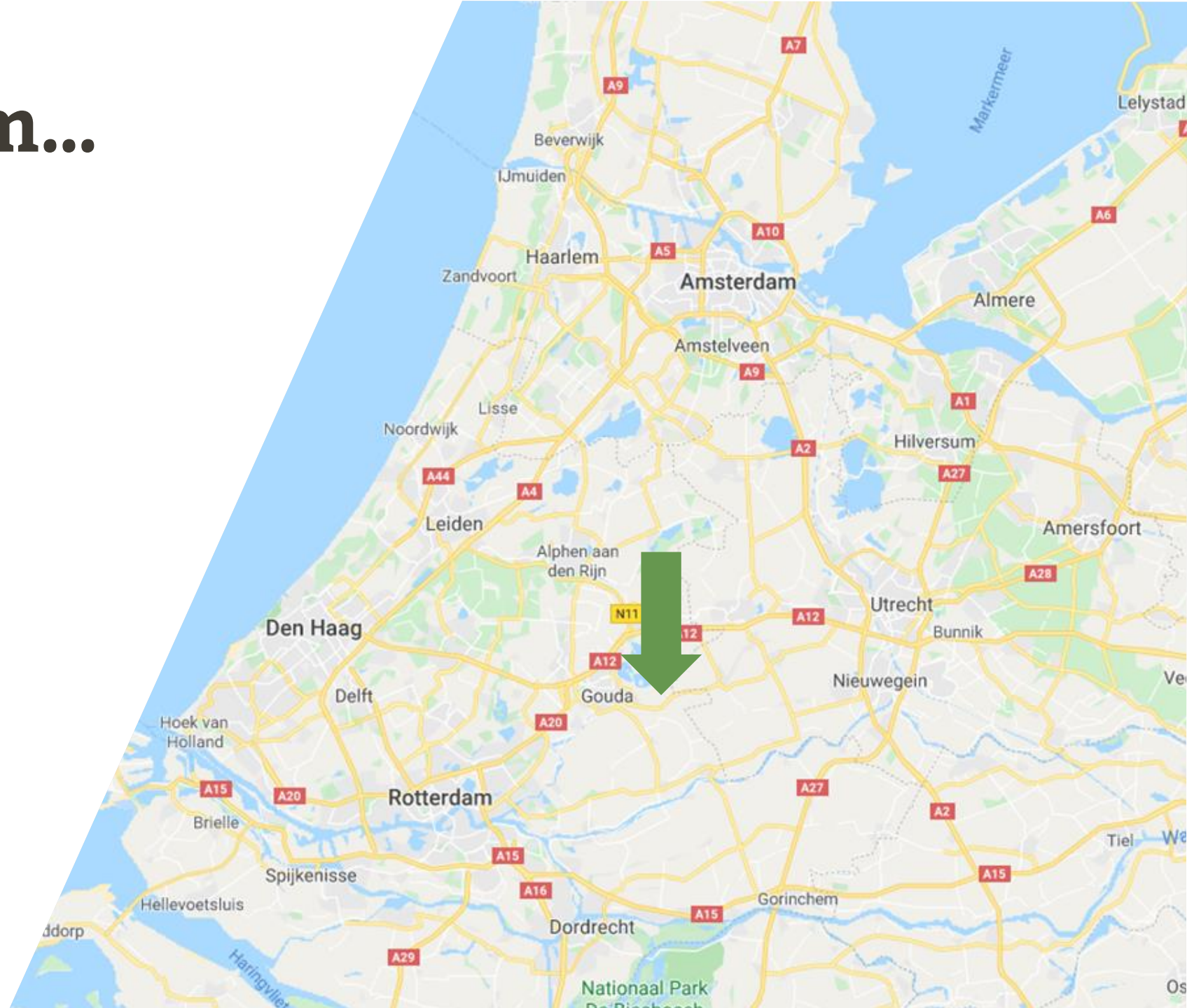
linkedin.com/in/MarcLelijveld



Data-Marc.com



Where I'm from...



What we cover today

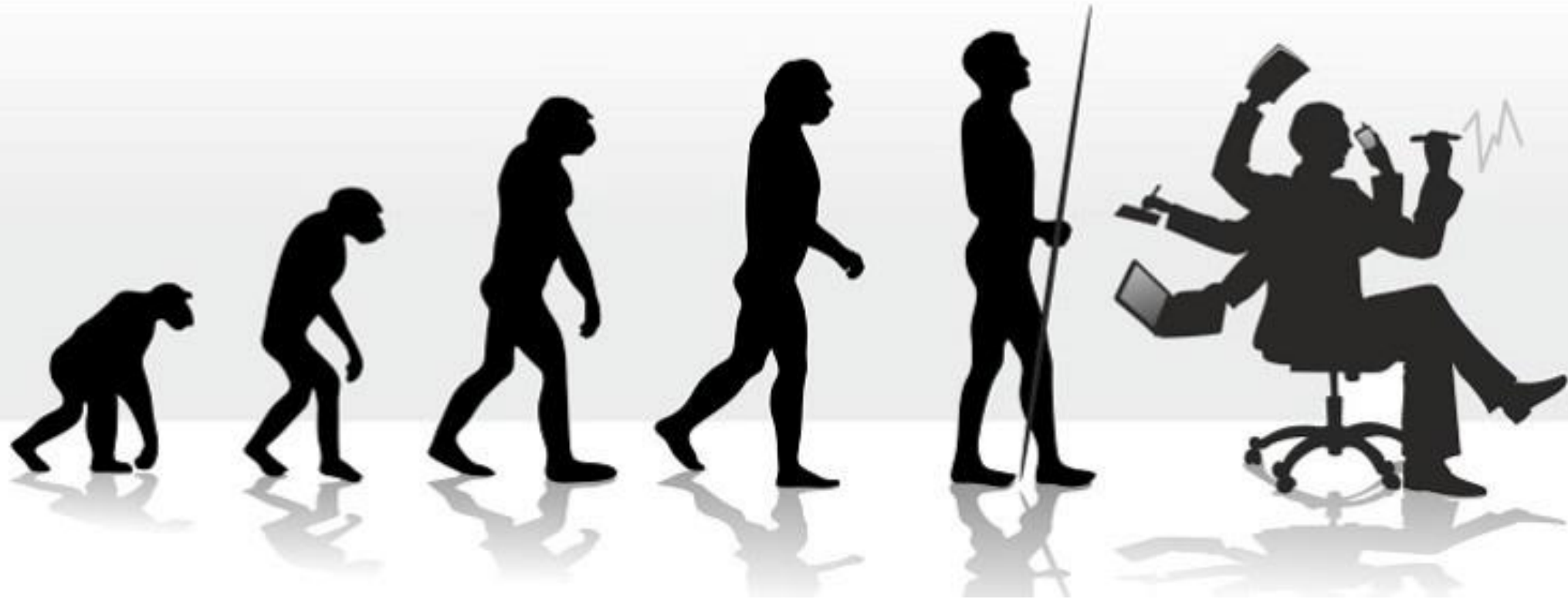
- The evolution of BI
- Deployment Pipelines
- Deployment framework
- Azure DevOps vs Deployment Pipelines
- What about dataflows?



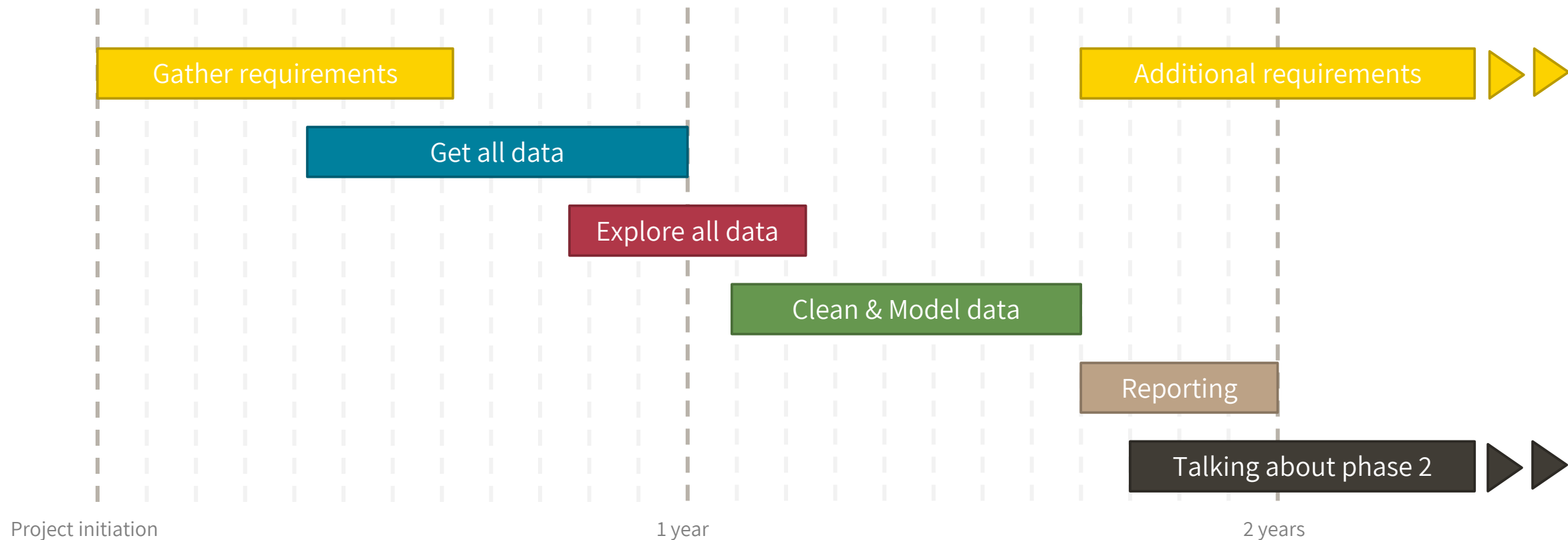
Our way of working



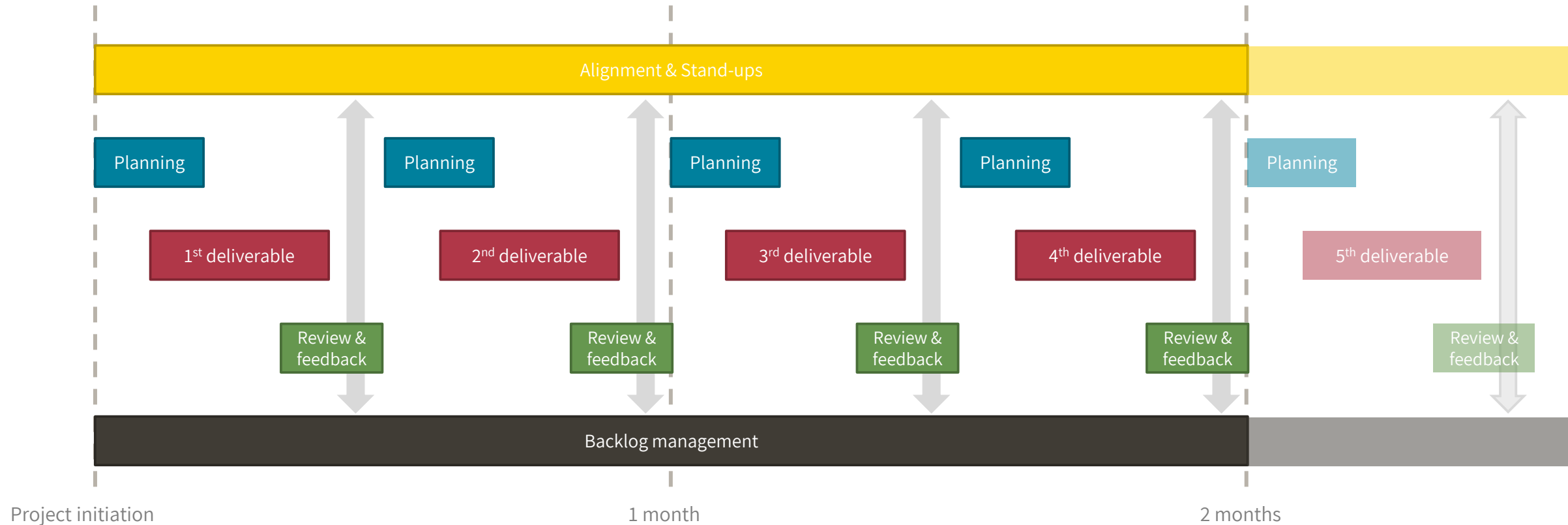
Busy era



Classic approach



Start working agile



The evolution of BI



The evolution of BI

1st wave
Corporate BI

2nd wave
Self-service BI

3rd wave
End user BI



IT to end user



Analyst to end user


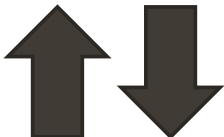



Everyone




Self-service vs End-user BI



Deployment scenarios

	Corporate BI	IT-Managed Self-Service BI	Business-Led Self-Service BI
Approach	 Top-Down	 Blended	 Bottom-Up
Data sources	Published by IT	Only governed sources	Any type of data source
Ownership	Fully supported by IT	IT for data model, Business for reports	Business supports all elements of the solution
Governed by	IT	IT for data, business for reports	Business
Usage scope of business	Only use of content	Creation of (custom) reports and dashboards	Data prep, modelling, reports and dashboards
Endorsement	Certified	Promoted	None

Deployment scenarios

	Corporate BI	IT-Managed Self-Service BI	Business-Led Self-Service BI
Approach	 Top-Down	 Blended	 Bottom-Up
Data sources	Published by IT	Only governed sources	Any type of data source
Ownership	Fully supported by IT 100%	IT for data modelling Business for support 50/50	Business supported by IT element of collaboration 100%
Governed by	IT IT-Driven	IT for data, business for reports	Business Business Driven
Usage scope of business	Only use of content	Creation of (custom) reports and dashboards	Data prep, modelling, reports and dashboards
Endorsement	Certified	Promoted	None

Today's challenges

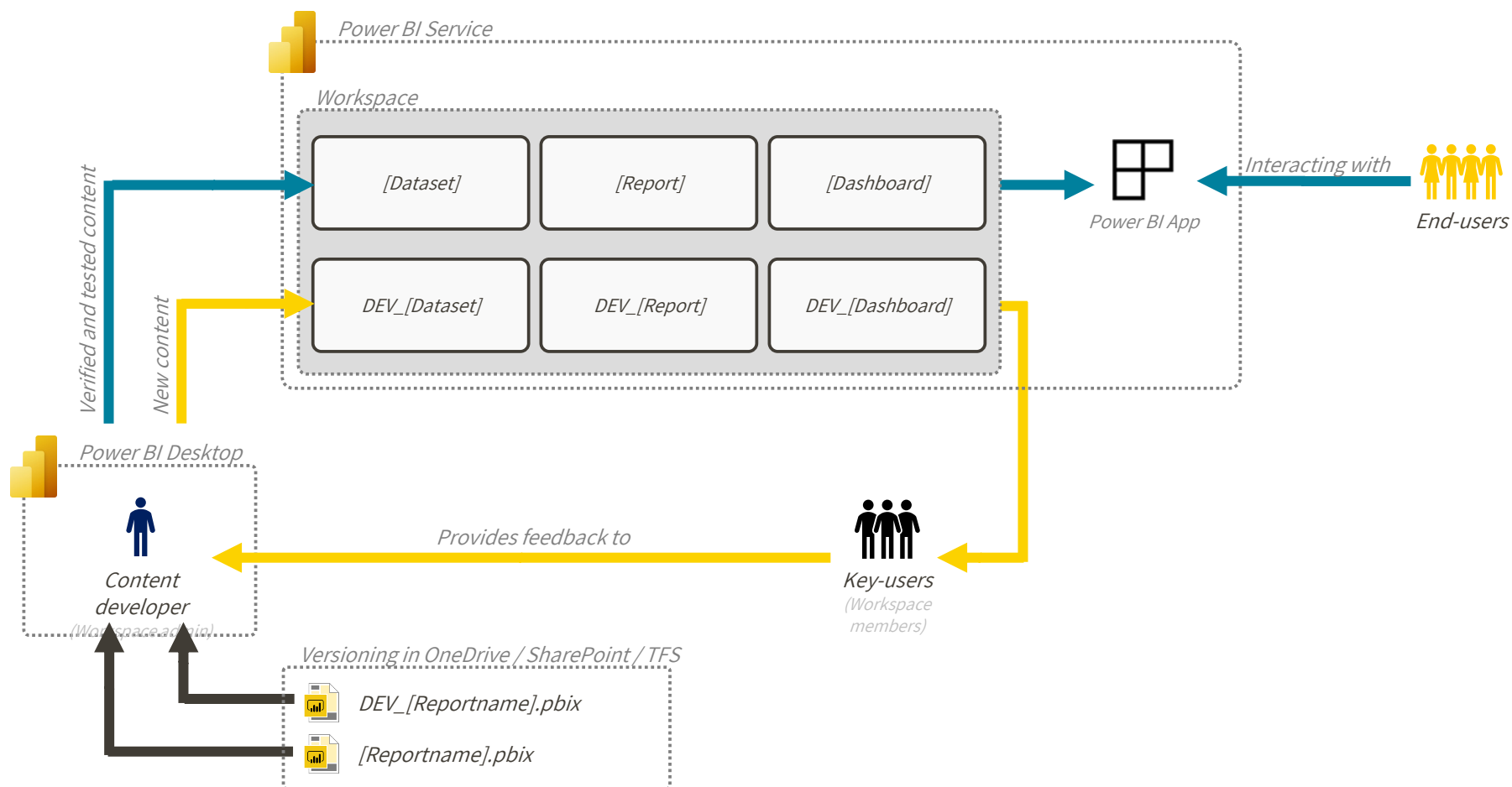
- Growing demand for BI
- Shorter time from ideation to delivery
- Faster development
- No room for mistakes
- More professional way to manage our content
- Structure and standardization



The background of the slide features a grayscale image of two construction workers silhouetted against a large window frame. One worker on the left is standing and holding onto a horizontal beam, while the other on the right is bent over, working on the lower part of the frame. The window frame consists of a grid of vertical and horizontal bars with diagonal cross-bracing.

Deployment framework – self service

Deployment scenario (self service scale)



Deployment scenario (self service scale)

Parameters

New

EnvironmentSwitch

Name

EnvironmentSwitch

Description

Switch between Development, Acceptance and Production environment.

☒ Required

Type

Text

Suggested Values

List of values

1	https://
2	https://
3	https://
*	

Default Value

https://

Current Value

https://

OK

Cancel

Settings for Parameterize Datasource

[Refresh history](#)

▶ Gateway connection

▶ Data source credentials

▶ Parameters

EnvironmentSwitch

Switch between Development, Acceptance and Production environment

https://SomeSite.sharepoint.com/sites/Site01/

SwitchFolderLocation

Switchs folders

C:\Users\MarcL\Documents\Study.xlsx

Apply

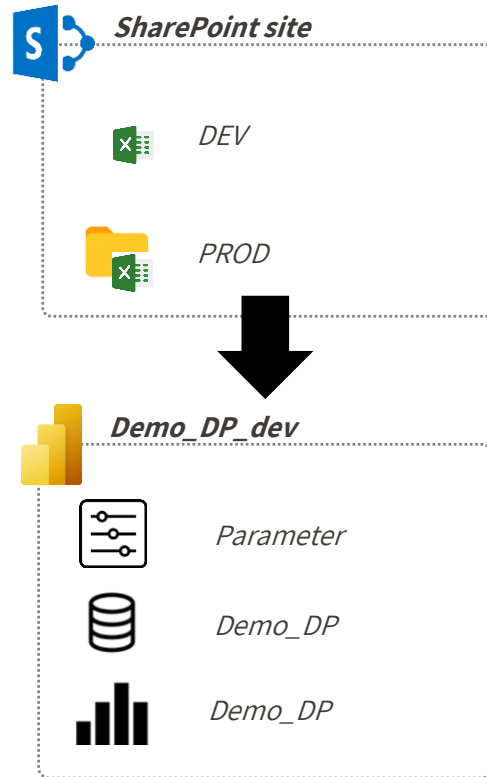
Discard

▶ Scheduled refresh

▶ Q&A and Cortana

▶ Featured Q&A questions

Demo context (self service scale)



Demo time!

Because life is boring without risks



🏠

🌐

📁

📄

Home

Conversations

Documents

Shared with us

Notebook

Pages

Site contents

Recycle bin

Edit

AP

ALM - Parameter

+ New ▾

⬆ Upload ▾

📊 Edit in grid view

🔄 Sync

🔗 Add shortcut to OneDrive

📄 Export to Excel

⚡ Automate ▾

Documents

📄	Name ▾	Modified ▾	Modified By ▾	+ Add column ▾
📁	DEV	February 5	Demo User	
📁	PROD	February 5	Demo User	

FileHomeTransformAdd ColumnViewToolsHelp

Close & ApplyClose

New SourceNew Query

Recent SourcesEnter Data

Data source settingsData Sources

Manage ParametersParameters

Refresh PreviewQuery

PropertiesAdvanced EditorManage

Choose ColumnsRemove ColumnsManage Columns

Keep RowsRemove RowsReduce Rows

Sort

Split ColumnGroup By

12Replace ValuesTransform

Data Type: BinaryUse First Row as Headers

Merge QueriesAppend QueriesCombine FilesCombine

Text AnalyticsVisionAzure Machine LearningAI Insights

Queries [7]

Transform File from Data [3]

Sample Query [2]

Sample File

Sample File Parameter1 (Sample File)

Transform Sample File from Data

Transform File from Data

Other Queries [3]

EnvironmentSwitch (/DEV/)

SharePoint Folder

Data

Table.SelectRows(Source, each Text.Contains([Folder Path], EnvironmentSwitch))

	Content	Name	Extension	Date accessed	Date modified	Date created	Attributes	
1	Binary	Transactions_tm500.csv	.csv	null	5-2-2022 20:58:51	5-2-2022 20:58:51	Record	http

Query Settings

PROPERTIES

Name

SharePoint Folder

All Properties

APPLIED STEPS

Source

Filtered Rows

8 COLUMNS, 1 ROWColumn profiling based on top 1000 rows

PREVIEW DOWNLOADED AT 13:47

FileHomeTransformAdd ColumnViewToolsHelp

Close & ApplyClose

New SourceNew Query

Recent SourcesEnter Data

Data source settingsData Sources

Manage ParametersParameters

Refresh PreviewQuery

PropertiesAdvanced EditorManage

Choose ColumnsRemove ColumnsManage Columns

Keep RowsRemove RowsReduce Rows

Sort

Split ColumnGroup By

12Replace Values

Data Type: BinaryUse First Row as HeadersTransform

Merge QueriesAppend QueriesCombine

Text AnalyticsVisionAzure Machine Learning

AI Insights

Queries [7]

Transform File from Data [3]

Sample Query [2]

Sample File

Sample File Parameter1 (Sample File)

Transform Sample File from Data

Transform File from Data

Other Queries [3]

EnvironmentSwitch (/PROD/)

SharePoint Folder

Data

Table.SelectRows(Source, each Text.Contains([Folder Path], EnvironmentSwitch))

	Content	Name	Extension	Date accessed	Date modified	Date created	Attributes	
1	Binary	Transactions_tm500.csv	.csv	null	5-2-2022 20:59:04	5-2-2022 20:59:04	Record	http
2	Binary	Transactions_tm1500.csv	.csv	null	5-2-2022 20:59:04	5-2-2022 20:59:04	Record	http
3	Binary	Transactions_tm1000.csv	.csv	null	5-2-2022 20:59:04	5-2-2022 20:59:04	Record	http
4	Binary	Transactions_tm2000.csv	.csv	null	5-2-2022 20:59:04	5-2-2022 20:59:04	Record	http
5	Binary	Transactions_tm2584.csv	.csv	null	5-2-2022 20:59:04	5-2-2022 20:59:04	Record	http

Query Settings

PROPERTIES

Name

SharePoint Folder

All Properties

APPLIED STEPS

Source

Filtered Rows

8 COLUMNS, 5 ROWS

Column profiling based on top 1000 rows

PREVIEW DOWNLOADED AT 13:47

Marc.com

SharePoint Folder

Display Options ▾



```
let
    Source = SharePoint.Files("https://datamarc.sharepoint.com/sites/ALM-Parameter/", [ApiVersion = 15]),
    #"Filtered Rows" = Table.SelectRows(Source, each Text.Contains([Folder Path], EnvironmentSwitch))
in
    #"Filtered Rows"
```

✓ No syntax errors have been detected.

Done

Cancel



Create a deployment pipeline

Use a pipeline to manage your workspace content through the deployment stages, continuously delivering the latest content to your users.

Deployment Pipelines

1 Create a pipeline

Start by creating the pipeline you'll use for managing and deploying the workspace content

2 Assign your workspace

Select your workspace and assign it to a deployment stage (development, test, or production).

3 Develop and test your content

Manage, preview, and compare your workspace content until its ready for releasing to users

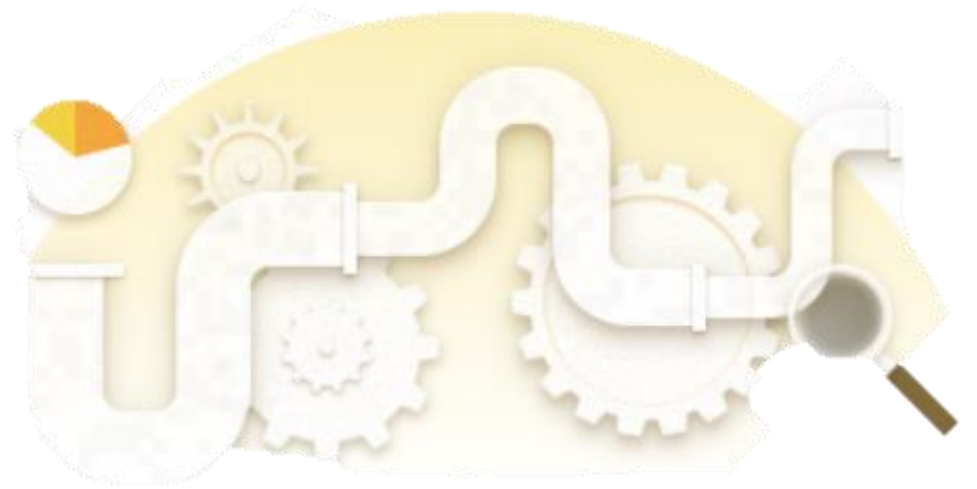
4 Share with your users

Deploy your content to production and share it with your organization

Create a pipeline

How it works

- Meta data deployment
- Incremental deployment
- Requires Premium! (must be P-sku in production!)
- No versioning (yet?)





Development

Design, review, and revise your content in a development workspace. When it's ready to test and preview, deploy the content to the test stage. [Learn more](#)

Documentation demo

DATASETS REPORTS DASHBOARDS

5 Refresh now 5 5

Select related 3 selected

Historical sales

MyFoods income

Product revenue

Sales analysis drilldown

+ New

Sentiment analysis

Historical sales

MyFoods income

Show less

[Publish app](#)

[Deploy to test](#)

Test

Test and verify your content in a preproduction workspace. When it's ready to distribute, deploy the content to the production stage. [Learn more](#)

Documentation demo [Test] Deployed: 4/20/2020, 3:39:00 PM

DATASETS REPORTS DASHBOARDS

4 Refresh now 3 5

Historical sales

MyFoods income

Product revenue

Sentiment analysis

Historical sales

MyFoods income

Show less

[Publish app](#)

[Deploy to production](#)

Production

Your content has been tested and is ready to distribute to your consumers as an app or by access to the production workspace. [Learn more](#)

Documentation demo [Produ...] Deployed: 4/21/2020, 4:39:13 AM

DATASETS REPORTS DASHBOARDS


4 Refresh now 3 5


Show more

[Publish app](#)


[Update app](#)

Deployment settings

 Documentation demo

 Development

Design, review, and revise your content in a development workspace. When it's ready to test and preview, deploy the content to the test stage. [Learn more](#)

 Test

Test and verify your content in a preproduction workspace. When it's ready to distribute, deploy the content to the production stage. [Learn more](#)

 Documentation demo

DATASETS 5 [Refresh now](#)

REPORTS 5

DASHBOARDS 5

Show more ▾

[Publish app ↗](#)

Deploy to test

 Documentation demo [Test]

Deployed: 4/21/2020, 5:04:18 AM

DATASETS 5 [Refresh now](#)

REPORTS 5

DASHBOARDS 5

Show more ▾

[Publish app ↗](#)

Deploy to production

← Sales analysis drilldown

Create rules defining parameter values and data sources for this dataset. These rules will be applied when deploying to this stage. You can go to [dataset settings](#) to edit parameters and data sources directly. [Learn more](#)

▾ Data source rules



No rules were added yet

Define the data source that will be connected to this dataset.

[+ Add rule](#)

▸ Parameters rules

Demo time!

Because life is boring without risks



Why you should care about Power BI Deployment Pipelines

ON [JULY 9, 2020](#) / BY [MARC](#) / IN [POWER BI PREMIUM](#), [POWER BI SERVICE](#) / [EDIT](#)

After a short holiday break, it is time for a new blog post! This time about one of the most exciting functionalities in Power BI that has been released in the past release wave, Power BI Deployment Pipelines!

In this blog I will elaborate on what Power BI Deployment Pipelines are, why it is an important part of your landscape and a comparison to other options you

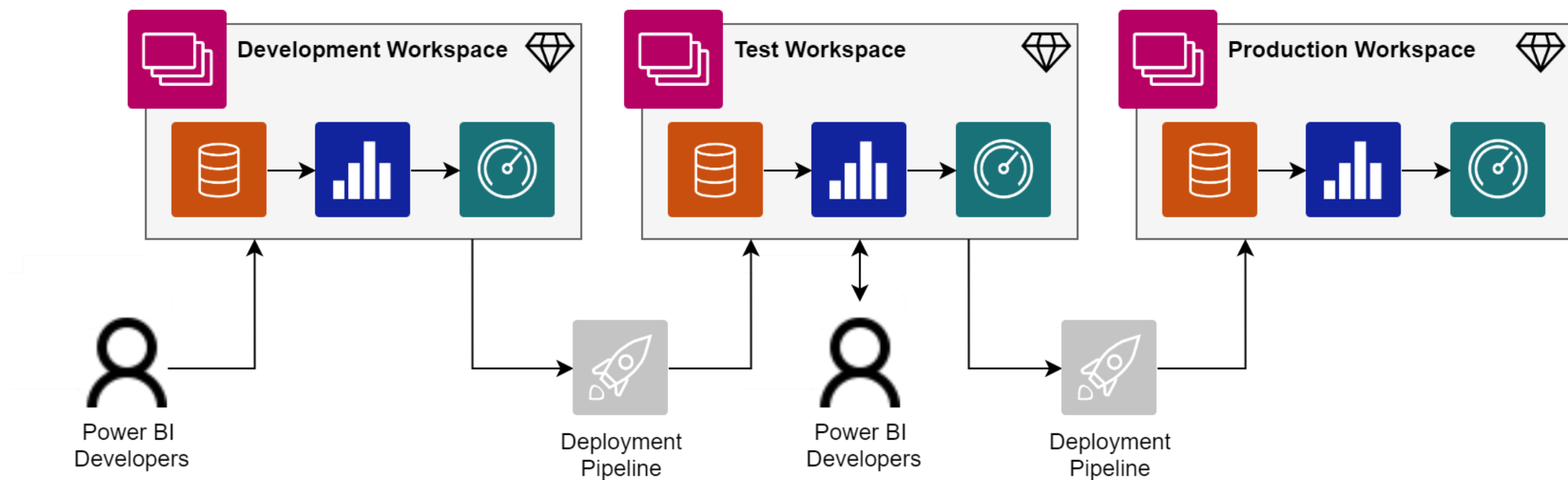
SEARCH



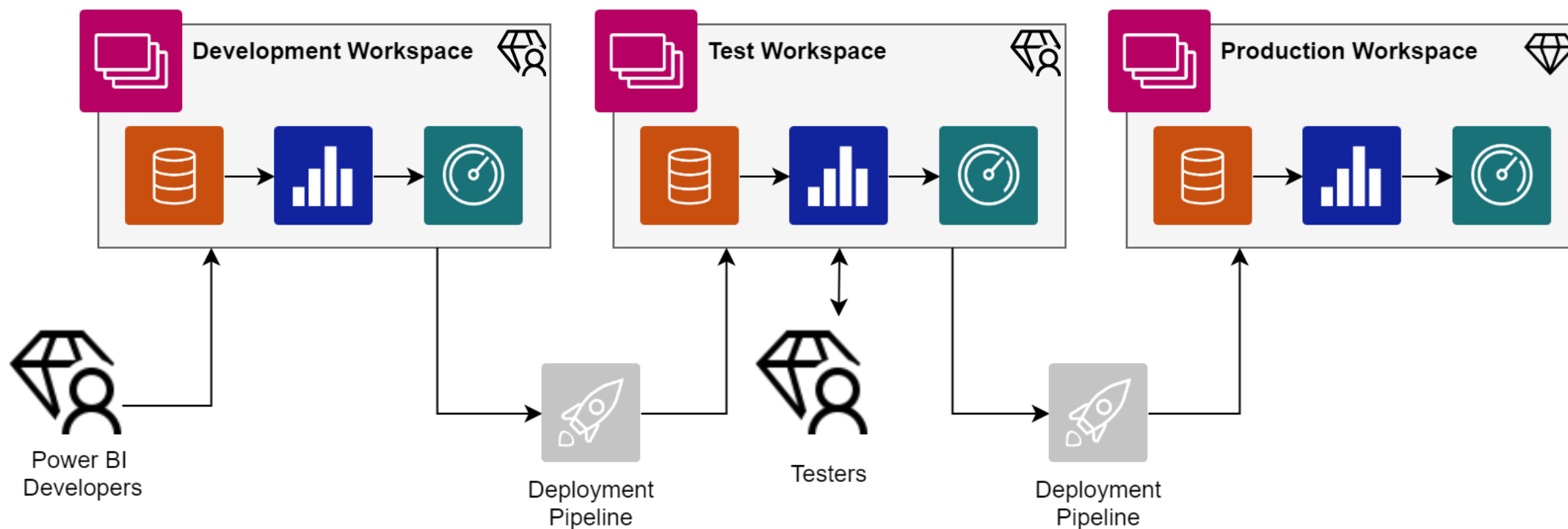
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Default setup



Possible option to lower capacity allocation



Data – Marc

Blogging about everything related to Data and AI based on Microsoft technology

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Leverage Power BI Deployment Pipelines with Premium per user licensing

ON [OCTOBER 5, 2020](#) / BY [MARC](#)

/ IN [DEVELOPING](#), [POWER BI PREMIUM](#), [POWER BI SERVICE](#)

At Microsoft Ignite, there were two really exciting announcements when it comes to enterprise features for Power BI. Both directly took my attention, as well as for many others. Obviously, the first one is Power BI Premium per user (PPU) licensing. Secondly, Deployment Pipelines reached General Availability!

Two super important features for enterprises and the maturity of Power BI! Let's have a look at both announcements and how these announcements together will have a massive impact!

SEARCH



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The background of the slide features a grayscale image of two construction workers silhouetted against a bright, overexposed sky. They are working on a complex steel framework, likely for a large building or bridge. One worker on the left is standing and reaching up to hold a horizontal beam. The other worker on the right is bent over, working on a lower section of the structure. The steel beams create a grid-like pattern across the image.

Deployment framework – large organizations

Azure DevOps



Azure Boards

Deliver value to your users faster using proven agile tools to plan, track, and discuss work across your teams.



Azure Test Plans

Test and ship with confidence using manual and exploratory testing tools.



Azure Pipelines

Build, test, and deploy with CI/CD that works with any language, platform, and cloud. Connect to GitHub or any other Git provider and deploy continuously.



Azure Artifacts

Create, host, and share packages with your team, and add artifacts to your CI/CD pipelines with a single click.



Azure Repos

Get unlimited, cloud-hosted private Git repos and collaborate to build better code with pull requests and advanced file management.

Extensions Marketplace

Access extensions from Slack to SonarCloud to 1,000 other apps and services—built by the community.

Azure DevOps



Repository

```
1 import React from 'react';  
2 import ReactDOM from 'react-dom';  
3 import App from './App';
```

CI/CD pipeline



Code

PackageFramework master

Pushed

5 min ago



Build

mobile-tests

Succeeded

1 min ago



Production

web-deploy

In Progress

1 min ago



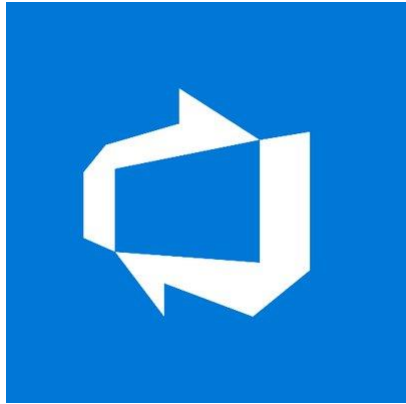
Azure resources

<http://fabrkiamfiber.azurewebsites.net>



Azure Pipelines

Deployment scenario (at enterprise scale)

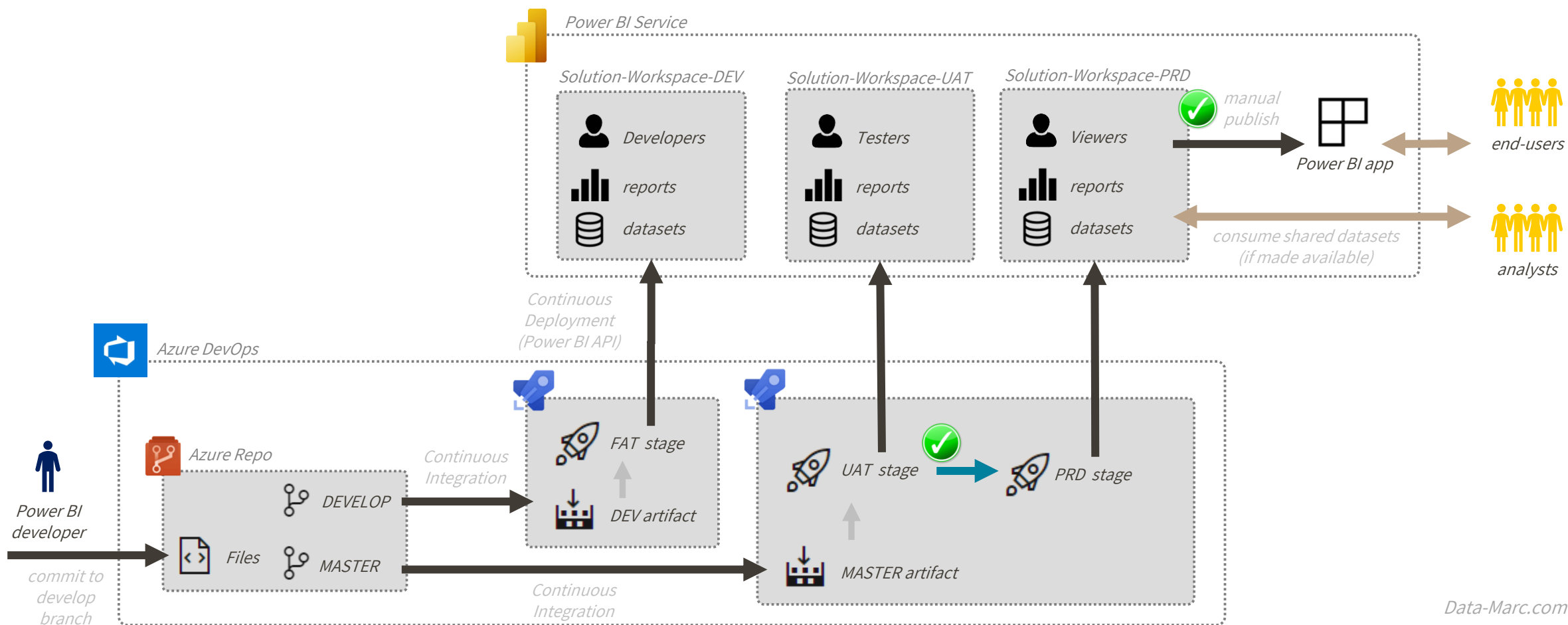


Azure DevOps



Power BI Service

Deployment scenario (at enterprise scale)



Demo time!

Because life is boring without risks




Release

Manually triggered

by  Marc Lelijveld
3/4/2022, 11:11 AM

Artifacts

 [_PBI Deployment Pipeli...](#)
[e9613309](#)
📁 main

Stages

Development

✔ Succeeded

1 warning
on 3/4/2022, 11:12 AM

Test

✔ Succeeded

1 warning
on 3/4/2022, 11:13 AM

Production

✖ Failed

Deploy content to the Prod...
on 3/4/2022, 11:17 AM



You can edit approvals, tasks, and variables of this release. Edits will be saved only to this release. To make changes to the pipeline, [edit the release pipeline](#)

Development

Deployment process

Agent job

Run on agent



Power BI Report Task: CreateReport

Power BI: Report Tasks



Power BI: Report Tasks

[View YAML](#)

Task version

Display name *

Power BI Report Task: CreateReport

Azure Details ^

Power BI service connection * | [Manage](#)

Macaw Extension - service connection



[+](#) New

PowerBI Details ^

Action *

Create or Update PowerBI Report



Workspace name *

0d21251c-696f-439c-a40e-bcf05687c64a

Power BI file *


\$(System.DefaultWorkingDirectory)/_PBI Deployment Pipeline/Sales & Returns Sample v201912 - BarCode Filter.pbix



Control Options ^

Output Variables ^




 **You can edit approvals, tasks, and variables of this release.** Edits will be saved only to this release. To make changes to the pipeline, [edit the release pipeline](#)

Test

Deployment process

Agent job

 Run on agent



Deploy content to the Test stage

Deploy content in a deployment pipeline



Deploy content in a deployment pipeline

 [View YAML](#)

Task version

Display name *


Deploy content to the Test stage

Power BI service connection * | [Manage](#)

Demo service connection



[+ New](#)


Pipeline * 


57364748-a89f-4a2f-b356-74b43de850fb

Target stage *


Test



☒ Next task starts only after the deployment is completed 

Artifacts to deploy * 


☒ All ☐ Selective


☐ Create new workspace if needed? 

☒ Allow the deployment to create new artifacts in the target workspace.

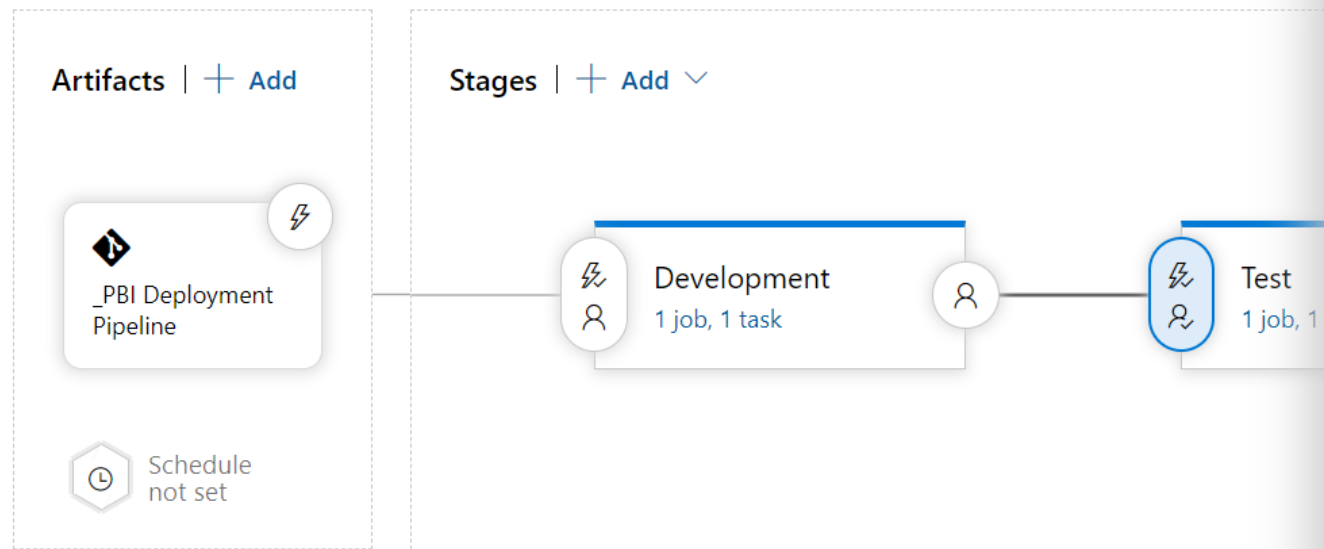
☒ Allow the deployment to overwrite existing artifacts in the target workspace.

☐ Update the app in the target workspace.

Deployment options 

Control Options 

Output Variables 



Pre-deployment conditions

Test

Triggers

Define the trigger that will start deployment to this stage

Pre-deployment approvals

Enabled

Select the users who can approve or reject deployments to this stage

Approvers

Demo User Marc Lelijveld Search users and groups for approvers

Approval order

Any order In sequence Any one user

Timeout

30

Days

Approval policies

- ☐ The user requesting a release or deployment should not approve it
- ☐ Revalidate identity of approver before completing the approval.
- ☐ Skip approval if the same approver approved the previous stage

Things to keep in mind

Make sure permissions are set correctly!

- Add the Service principal to each stage workspace and the deployment pipeline itself
- Grant delegated API permissions to the service principal in AAD (Pipelines & workspace permissions)

Get the DevOps extension

- Macaw extension for binary file upload for dev + pipeline tasks
- Microsoft extension if you prefer MSFT managed task, but does not support binary file upload



Integrate Power BI Deployment Pipelines with Azure DevOps

ON [JUNE 4, 2021](#) / BY [MARC](#)

/ IN [AZURE](#), [DEVELOPING](#), [POWER BI REST API](#), [POWER BI SERVICE](#), [POWERSHELL](#),
[XMLA ENDPOINTS](#)

Back in 2019, [Ton Swart](#) and I wrote a blog post on [Versioning and CI/CD for Power BI with Azure DevOps](#). Back then, there were not many options available for versioning and professionalizing your ALM story for Power BI. Till today, this blog post is still my most read blog on Data-Marc.com which makes us proud.

SEARCH

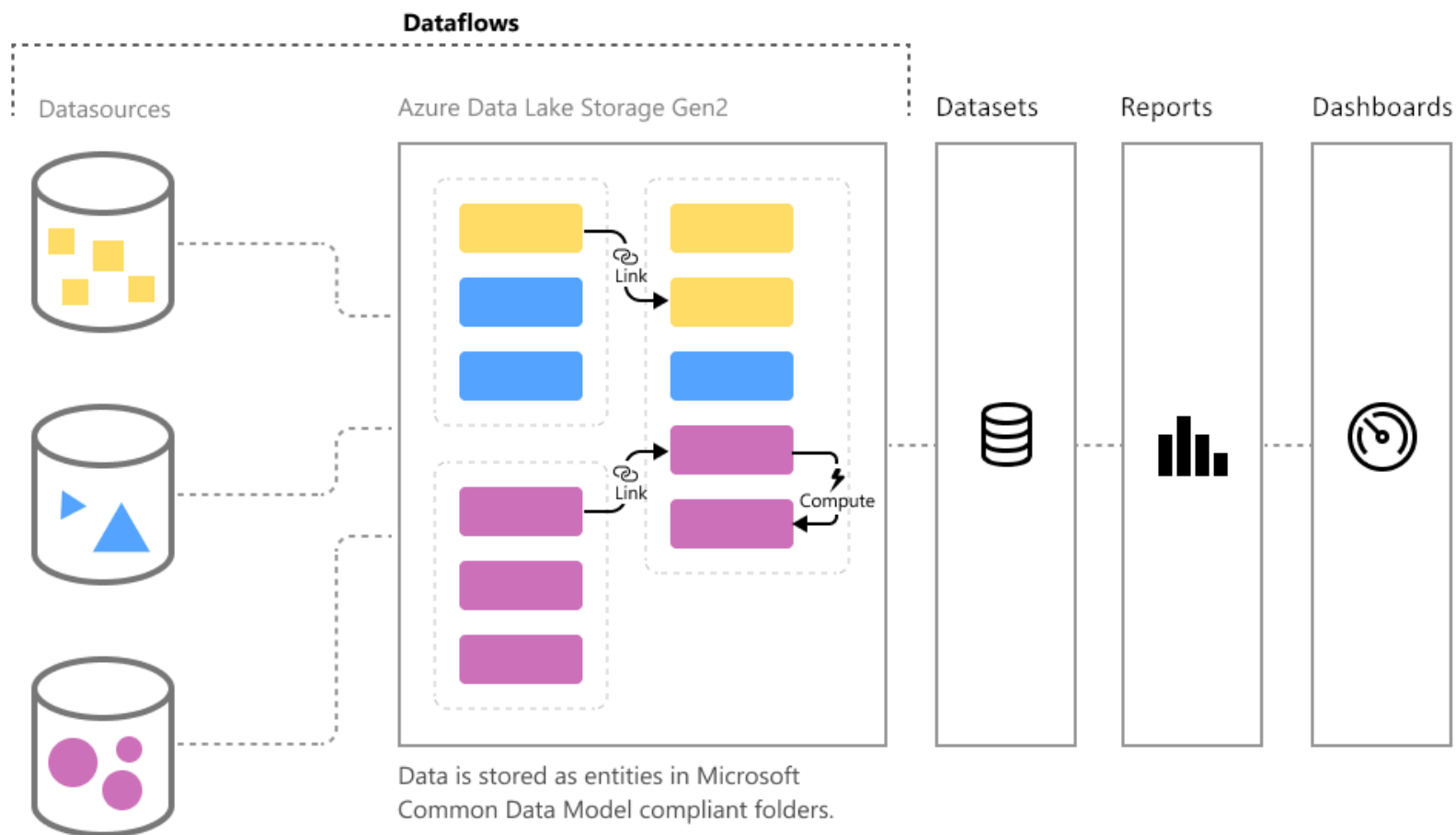


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But what about dataflows?



Dashboards Reports Workbooks Datasets Dataflows

Move dataflows across workspaces with the Power BI REST API

ON [OCTOBER 22, 2019](#) / BY [MARC](#)
/ IN [DATAFLOWS](#), [DEVELOPING](#), [POWER BI REST API](#), [POWER BI SERVICE](#),
[POWERSHELL](#)
/ [EDIT](#)

Dataflows are part of the Power BI service for a while now. More and more people are starting to benefit from it in multiple perspectives. The two most heard ones are re-use of data (and logic), but also isolate refreshes to avoid dependencies of refresh failures from different sources.

Same as for your data sources, you might have different workspaces setup in different stages of your DTAP development approach. In the past, I wrote a

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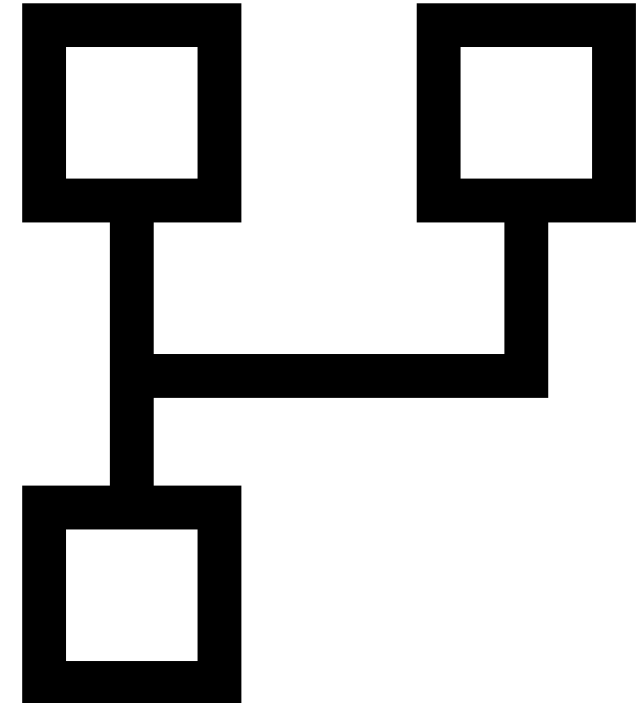
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CATEGORIES

Adoption (1)

Dataflows and CI/CD

- Dataflows are created and maintained in the Power BI Service
- Stage-to-stage deployment via pipelines is supported
- What about versioning of Dataflows?



Integrate Power BI Deployment Pipelines with Azure DevOps



Comparison

Functionality	Azure DevOps	Deployment Pipelines	Better option
Working with multiple users	Yes	Yes	-
Incremental deployment	No	Yes	Deployment pipelines
Meta data deployment	No	Yes	Deployment pipelines
Requires Power BI Premium	No	Yes	DevOps
Versioning	Yes	No	DevOps
Dataflow support	Yes	Yes	DevOps
Integration with other processes	Yes	Yes, via DevOps	DevOps
Customization	Yes	No	DevOps



Macaw Power BI Extensions

Macaw | 📦 778 installs | ★★★★★ (1) | Free

Power BI release manager tasks for VSTS.

Get it free

Overview

Q & A

Rating & Review


Macaw Power BI Extensions is a Build and Release Task for Azure Pipelines. With this tasks you can control your Power BI deployment in Azure DevOps

Actions that can be performed with this extension are:

- Workspace tasks
 - Create or Update Power BI workspace
 - Delete Power BI workspace
- Report tasks
 - Create or Update Power BI Report
 - Delete Power BI Report
 - Delete Power BI DataSet
 - Update the parameters values for the specified dataset
- Pipeline tasks
 - Deploy all content to a target stage
 - Deploy specific content to a target stage

For more information please read: <https://data-marc.com/2021/06/04/integrate-power-bi-deployment-pipelines-with-azure-devops/>

Agent job

 Run on agent



Power BI Group Tasks: Create
Power BI: Group Tasks



Power BI Report Task: Create
Power BI: Report Tasks



Categories

Azure Pipelines

Works with

Azure DevOps Services

Azure DevOps Server

Resources

[License](#)



Power BI automation tools (Preview)

Microsoft | 465 installs | ★★★★★ (0) | Free

Automate release management tasks related to Power BI deployment pipelines

Get it free

Overview

Q & A

Rating & Review

The Power BI [deployment pipelines](#) tool enables BI teams to build an efficient and reusable release process for their Power BI content. You can leverage the tasks in this Azure DevOps extension to integrate Power BI into your organization's automation process. Here are a few examples of what can be done using the extension:

- Manage Power BI pipelines from start to finish, including creating a pipeline, assigning a workspace to any stage, deploying and deleting the pipeline.
- Assign users to a pipeline.
- Assign users to a workspace.
- Deploy all/selected items in a Power BI pipeline to the next stage.

Learn more about using these tasks [here](#).

To get started with deployment pipelines, learn more [here](#).

Release Notes

Version	Remarks
1.0.2	Public preview release.

Add tasks

 Refresh



Delete a deployment p

Delete a Power BI deployment

Categories

Azure Pipelines

Tags

dataset

Deployment Pipelines

PBIX

Power BI

release

Utility task

Works with

Azure DevOps Services

Wrap up

Professionalize your deployment process

Easy **roll-back** within pipelines

Versioning can be achieved with DevOps

Deployment pipelines is worth using! But integration is even more powerful

Combine them, as they are **better together!**

LET'S
RECAP...

Thanks for attending!

<https://data-marc.com/?s=Deployment>

Please provide some feedback!

<https://sqlb.it/?7064>



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in linkedin.com/in/MarcLelijveld

🌐 Data-Marc.com



SQLBITS

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