

DataOps for Power BI

2022-12-16

Romain Casteres | CSA Data & Analytics



www.linkedin.com/in/casteres/



Agenda

1. DevOps & DataOps Concepts

2. Power BI Deployment Pipelines ⚙️

3. Power BI & Azure DevOps

4. Best Practices

⌚ Present tools and features
to support DataOps for Power BI
developments

Agenda

1. DevOps & DataOps Concepts
2. Power BI Deployment Pipelines 💎
3. Power BI & Azure DevOps
4. Best Practices

What is DevOps?

“DevOps is development and operations **collaboration**”

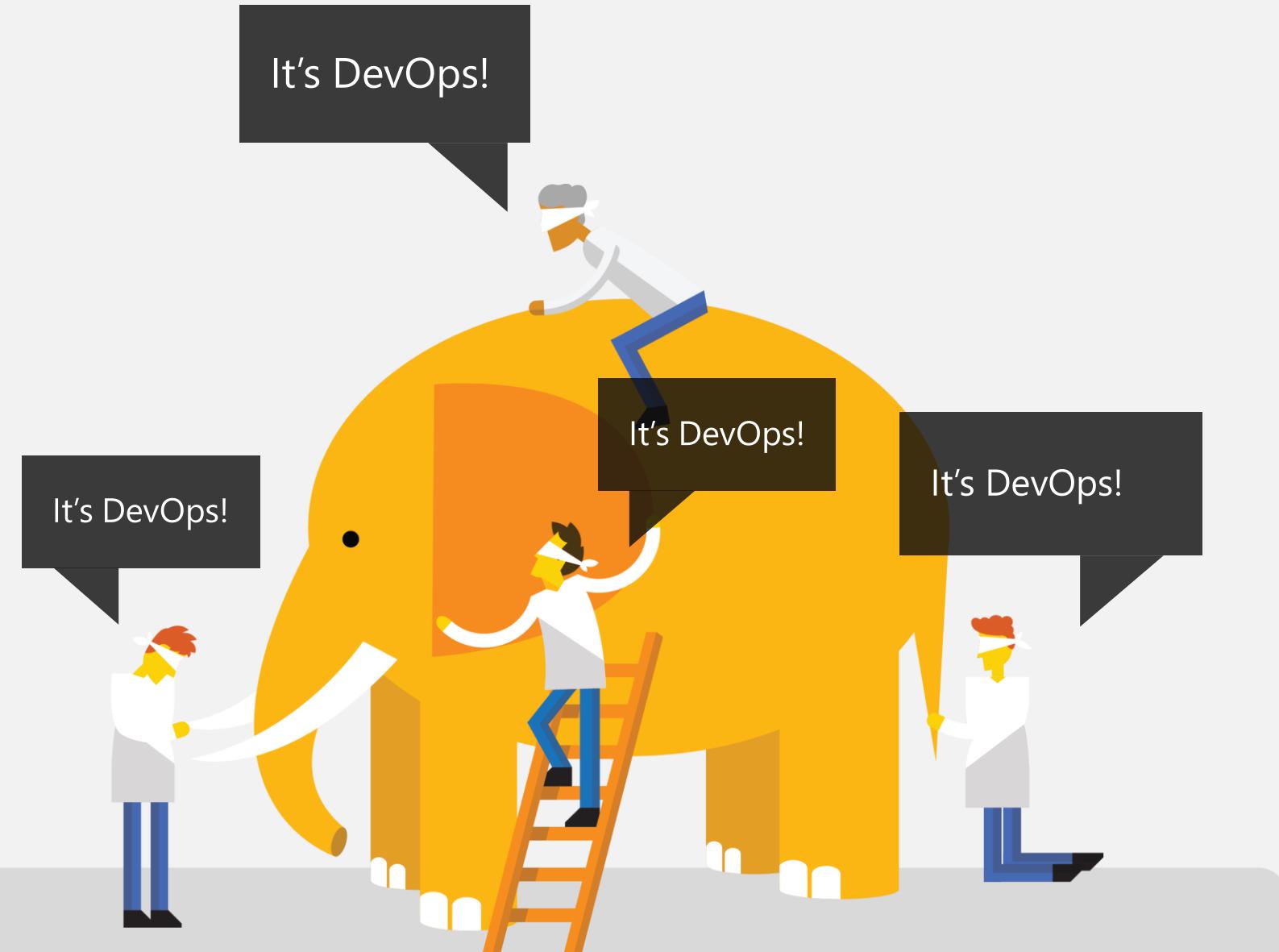
“DevOps is using automation”

“DevOps is **small** deployments”

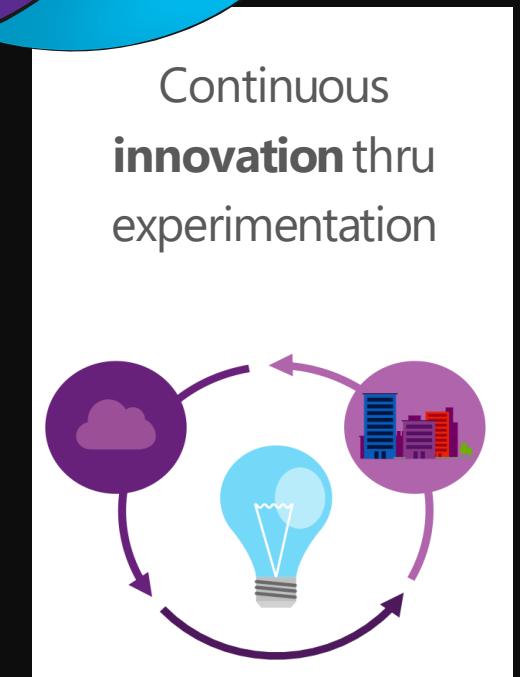
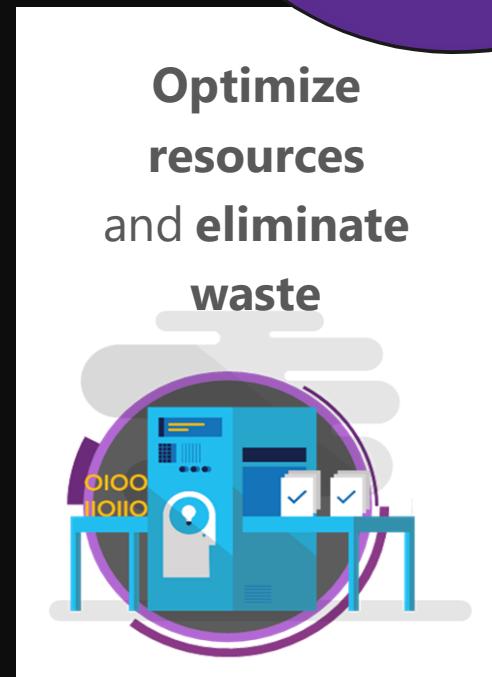
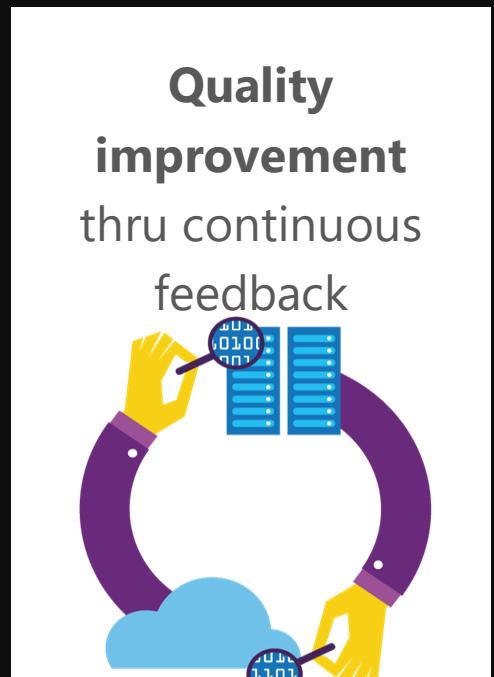
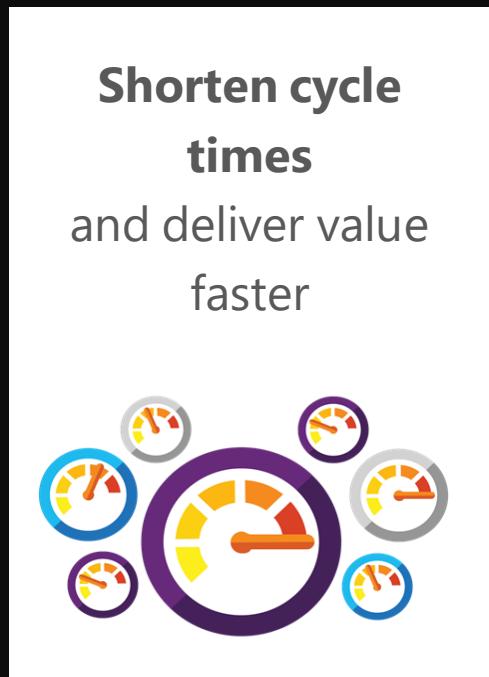
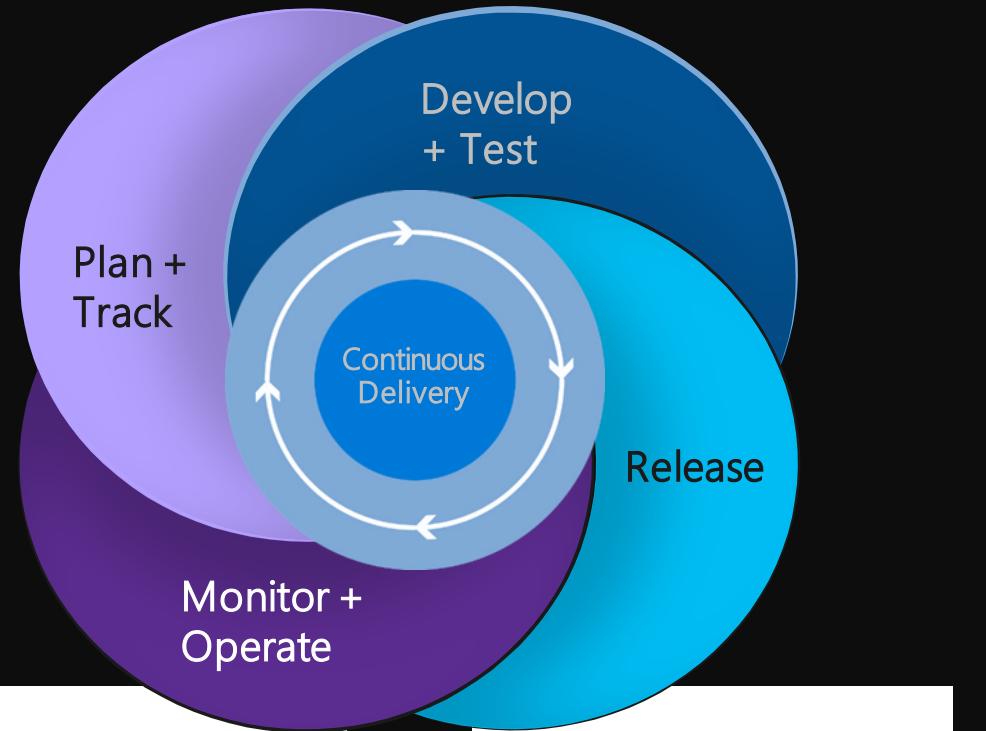
“DevOps is treating your infrastructure as code”

“DevOps is feature switches”

“Kanban for Ops?”

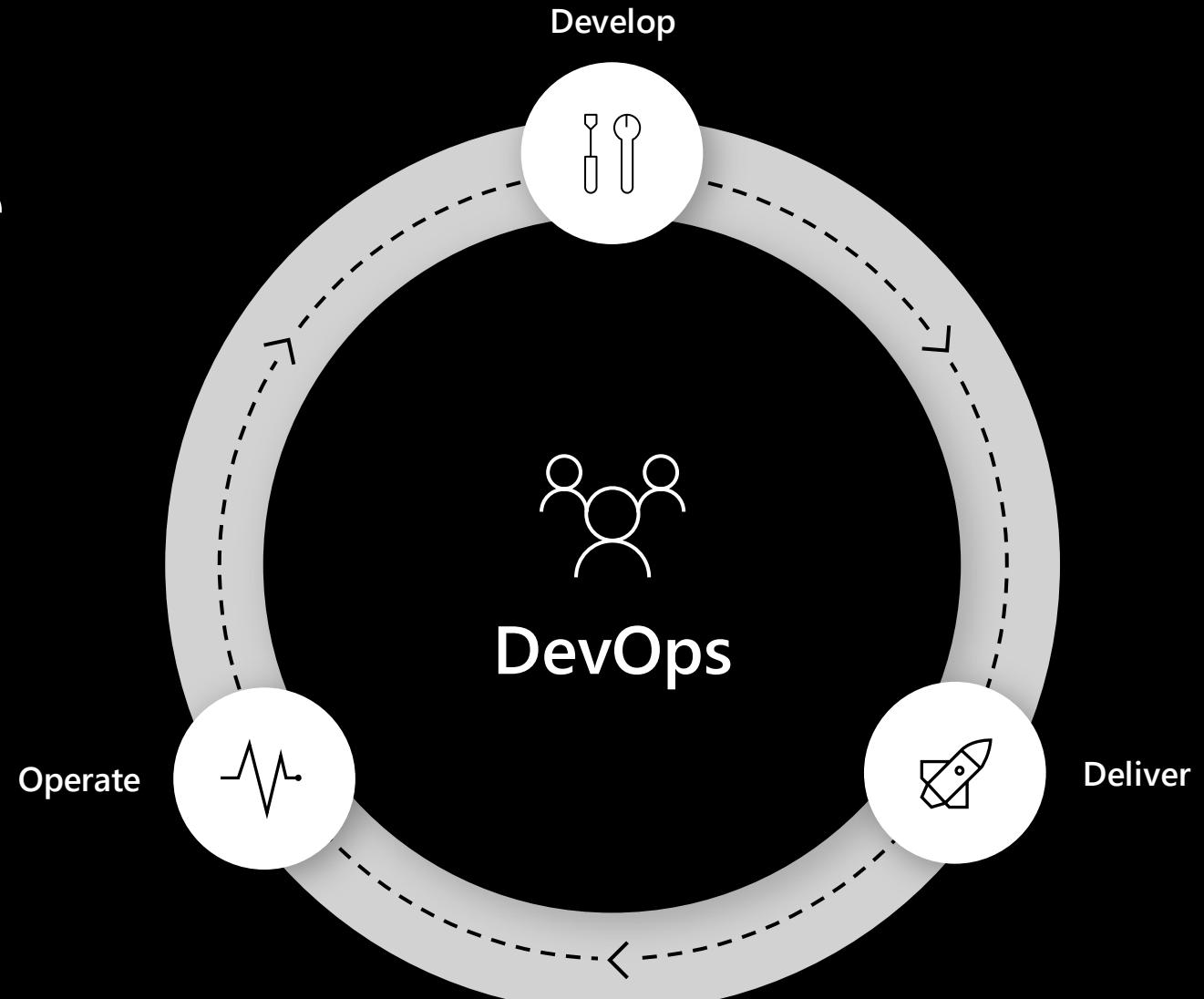
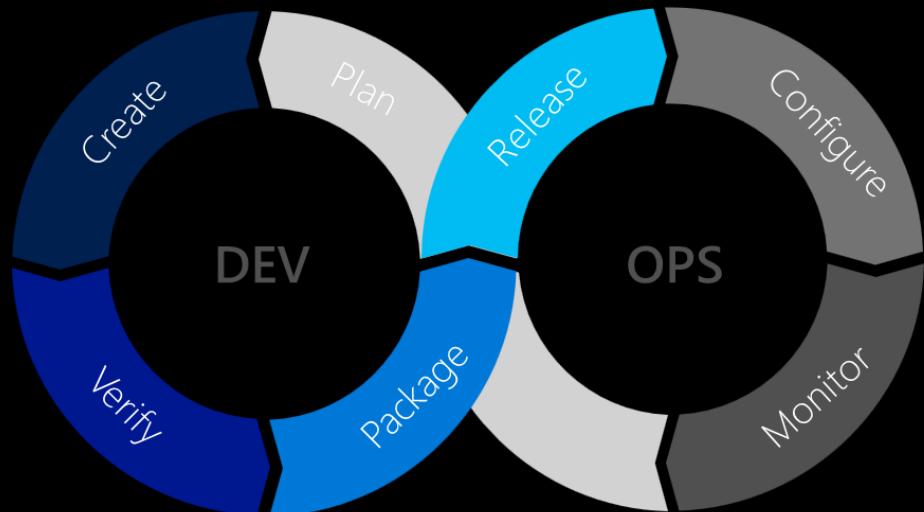


DevOps is the union of people, processes, and products to enable continuous delivery of value to our customers



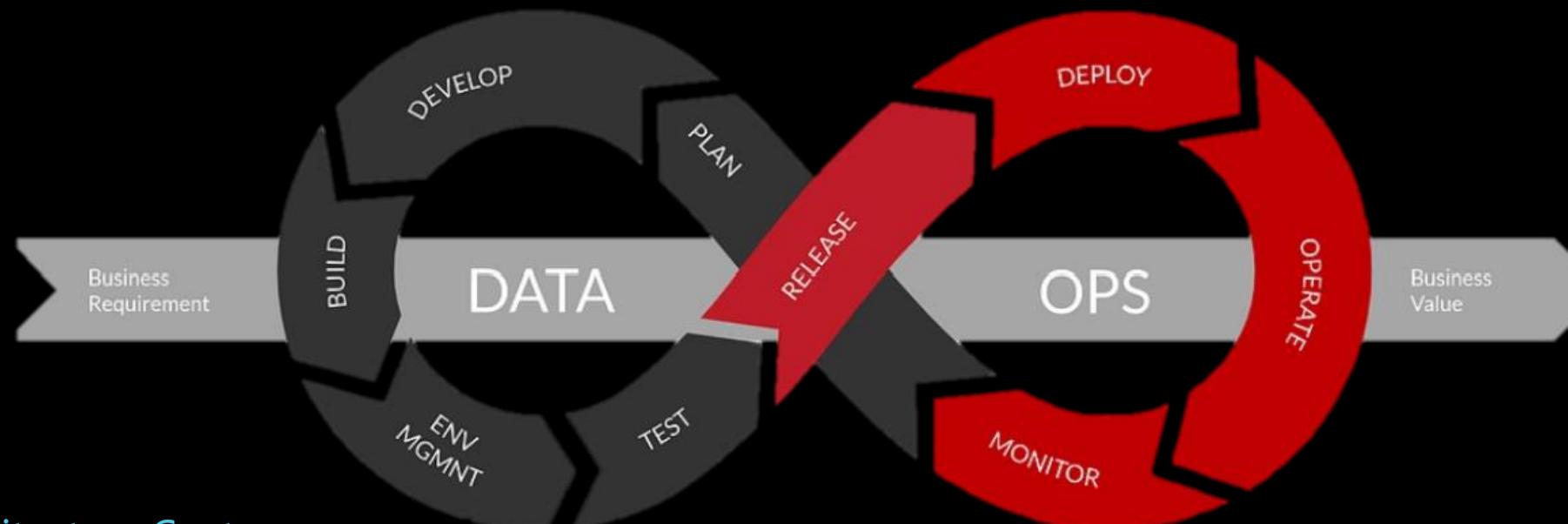
DevOps

DevOps is the union of **people**, **process**, and **products** to enable continuous delivery of value to your end users

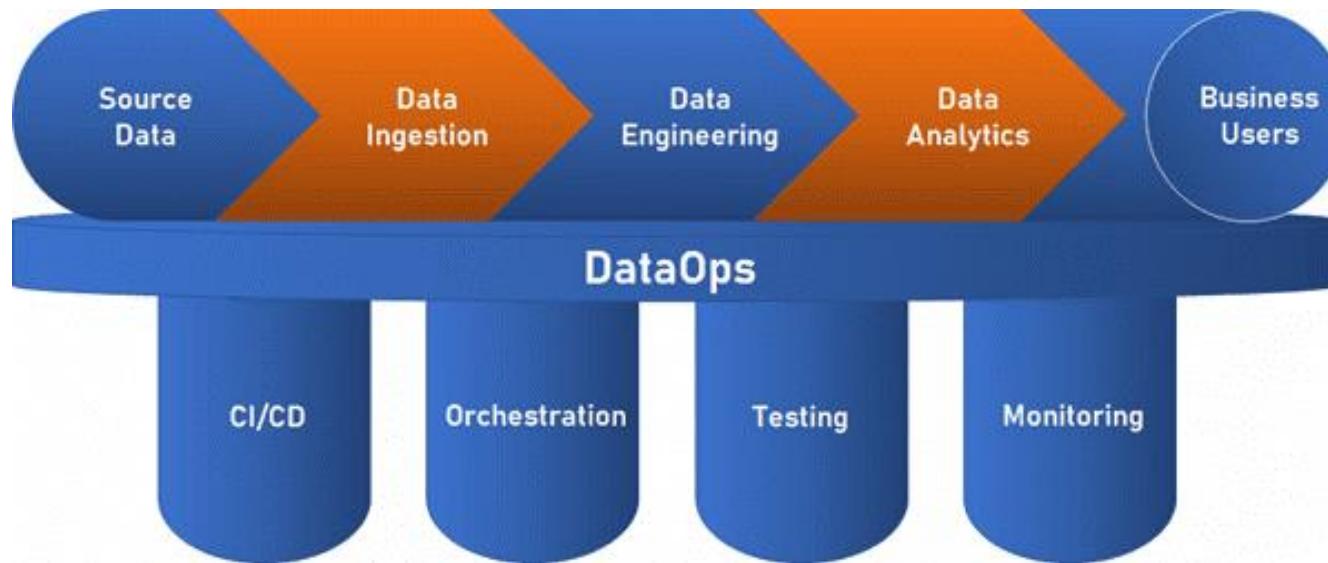


What is DataOps

DataOps is a **collaborative** data management practice focused on improving the communication, integration and automation of data flows between data managers and data consumers across an organization



DevOps vs DataOps



Similarities :

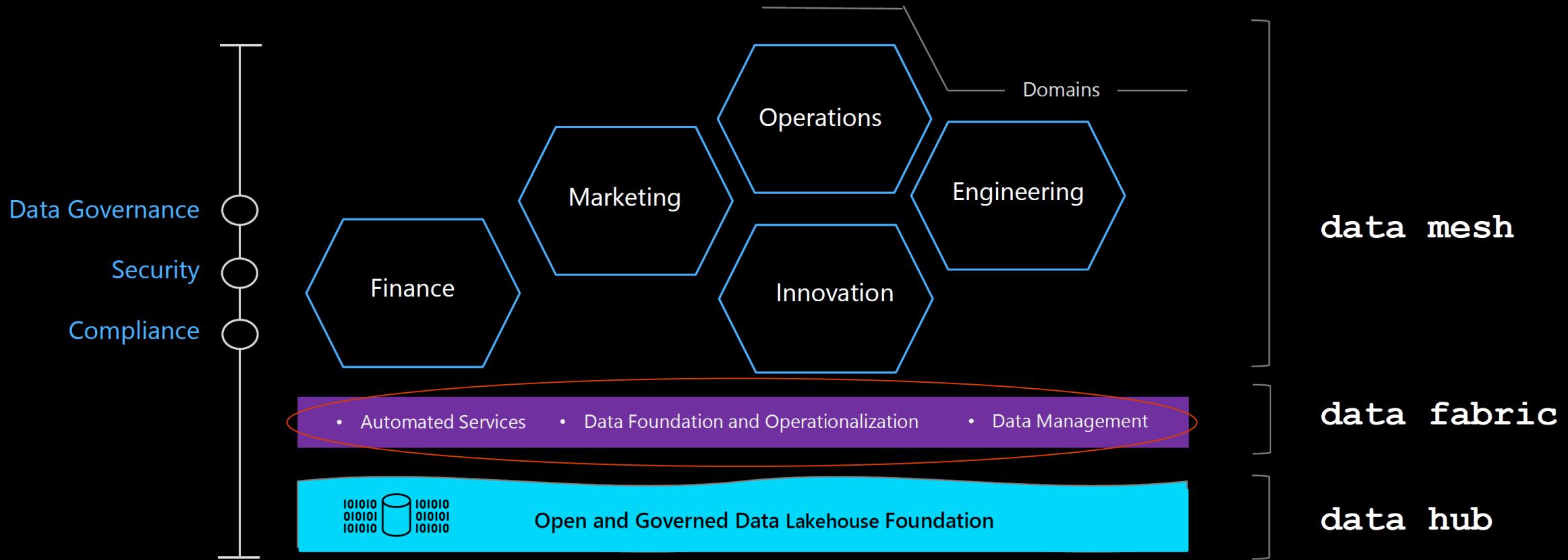
- Agile Mythology
- Value through iterative cycles
- Increased Collaboration

Differences :

- Outcome
- Workflow
- Testing

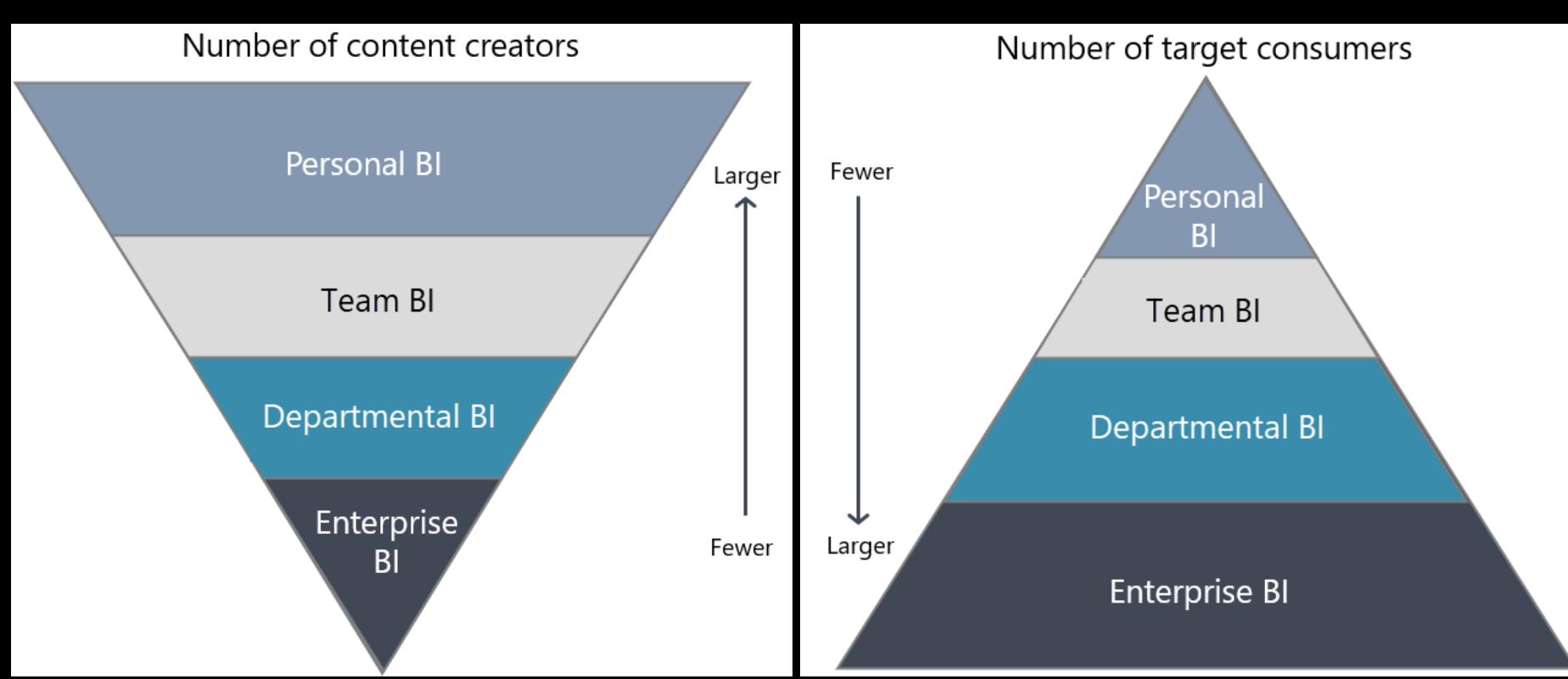
DataOps & Data Fabric

Microsoft's Hybrid Approach to **data mesh**, **data fabric** and **data hub**



Content delivery scope

Control, Quality

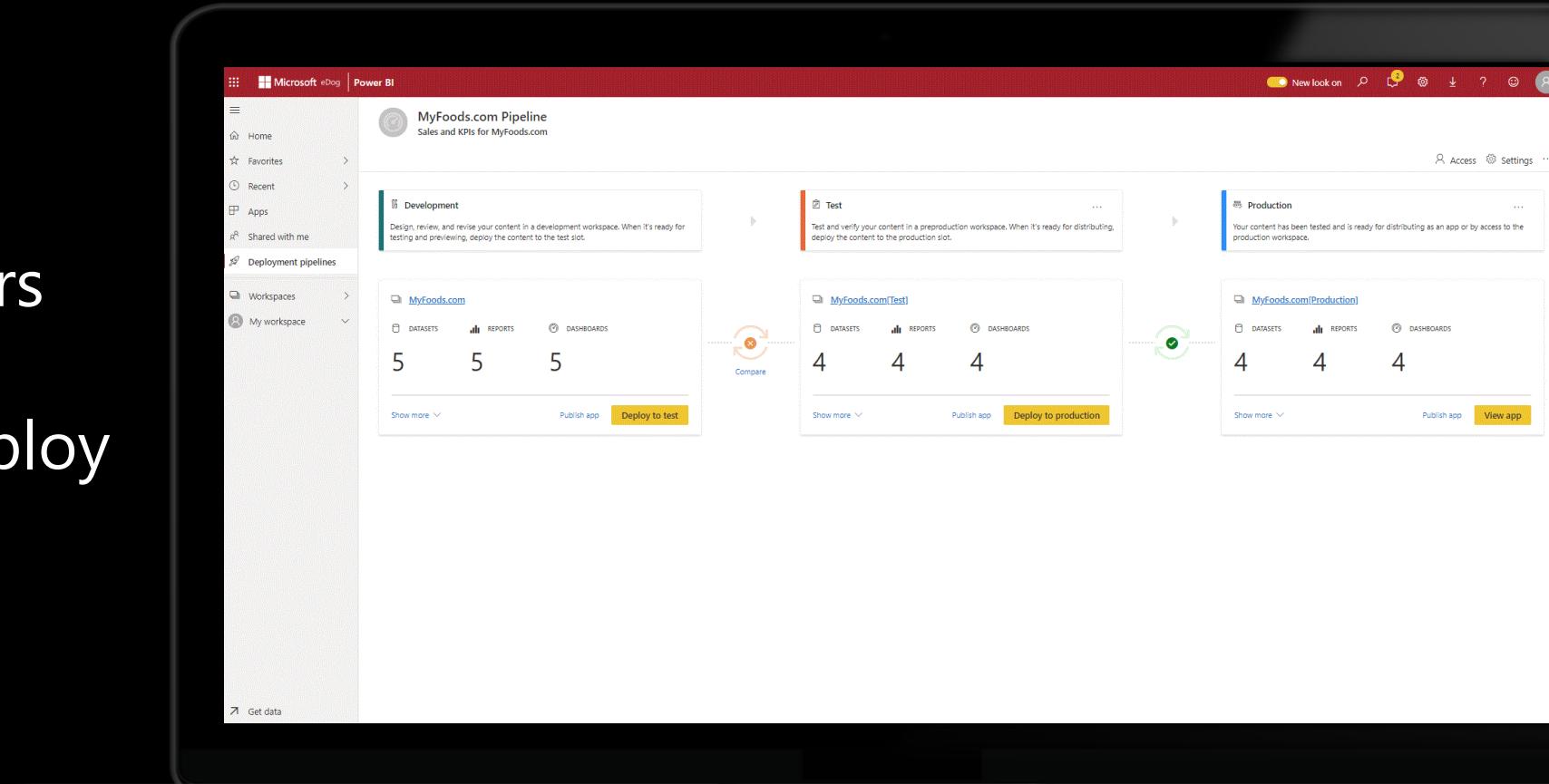


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Deployment pipelines 💎

Enable Power BI creators build an **efficient & reusable** process to deploy new **content** to users.



DEMO 1 – Power BI Deployment Pipelines

The screenshot shows two side-by-side Power BI workspaces: 'Test' on the left and 'Production' on the right. Both workspaces have identical structures: Dataflows (1), Datasets (2), Reports (4), and Dashboards (2). A 'Compare' button is highlighted in red on the left side.

Test Workspace Content:

- CDM
- Marketing analysis (+ New)
- US_Sales_Analysis
- Global sales and marketing (Different)
- Marketing analysis (+ New)

Production Workspace Content:

- CDM
- Marketing analysis (Missing from Test)
- US_Sales_Analysis
- Global sales and marketing (Different)
- Marketing analysis (Missing from Test)

A 'NEW' badge is visible in the top right corner of the deployment history interface.

Deployment history

All Development Test Production

All

Deployed to	Date and time	Deployed by	Items	Note	ID	Status
Test	07/31/22, 10:23 AM	RP Rene Pellet...	(-6) +3 = 64	?	1	✓
Test	07/06/22, 4:58 PM	RP Rene Pellet...	+ 74	?	2	✓
Test	06/06/22, 10:14 AM	RP Rene Pellet...	+ 1	?	3	✓
Test	06/02/22, 4:41 PM	RP Rene Pellet...	= 1	?	4	✓
Test	06/02/22, 4:32 PM	RP Rene Pellet...	Failed	?	5	✗

Microsoft Power BI Deployment pipelines

Search Sign out

Romain Casteres romainca@microsoft.com Microsoft License type: Premium Per User

Home Create Browse Data hub Metrics Apps Deployment pipelines Learn Workspaces My workspace

RCA_TEST_PIPELINE

Development [Learn more](#)

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.

Test [Learn more](#)

Test and verify your content in a preproduction workspace. When it's ready to distribute, deploy the content to the production stage.

Production [Learn more](#)

Your content has been tested and is ready to distribute to your consumers as an app or by access to the production workspace.

PremTest Deployed: 3/16/2022, 4:06:02 PM

Dataflows: 0 Datacharts (Preview): 0 Datasets: 3 Reports: 4

Show more View app Deploy to test

PremTest [Test] Deployed: 3/16/2022, 4:06:02 PM

Dataflows: 0 Datacharts (Preview): 0 Datasets: 3 Reports: 4

Show more Publish app Deploy to production

PremTest [Production] Deployed: 3/7/2022, 4:04:23 PM

Dataflows: 0 Datacharts (Preview): 0 Datasets: 3 Reports: 4

Show more Publish app Update app

Get data

What attributes are deployed?

Supported items

- Datasets
- Reports
- Dataflows
- Datamarts
- Dashboards
- Paginated reports

Unsupported items

- Datasets that don't originate from a PBIX
- PUSH datasets
- Streaming dataflows
- Reports based on unsupported datasets
- Template app workspaces
- Workbooks
- Metrics

Copy & override

- Report visuals
- Report pages
- Dashboard tiles
- Model metadata
- Item relationships

No copy, no override

- Data
- URL & ID
- Permissions
- WS settings
- App content and settings
- Refresh schedule

Copy with rules

- Datasources
- Parameters
- *More will be available in the future*

Deployment pipeline permissions

Pipeline admin

- View the pipeline
- Share the pipeline with others
- Edit and delete the pipeline
- Unassign a workspace from a stage
- Can see workspaces that are tagged as assigned to the pipeline in Power BI service

[Deployment pipelines, the Power BI Application lifecycle management \(ALM\) tool, process](#)

[Best practices for deployment pipelines, the Power BI Application lifecycle management \(ALM\) tool](#)

Automate Deployment Pipelines with APIs

With the Power BI Rest APIs, you can integrate Power BI into a comprehensive automation process. This includes:

- Pipeline Provisioning and Management
- User Access Management for Pipeline
- Schedule Pipeline Deployment
- Deploy Pipelines with Cascading Dependencies

There are several APIs can inject automation into to enable a more efficient deployment depending on your developers' requirements:



[Deploy All
Workspace
Content](#)



[Selectively deploy
specific Power BI
assets](#)



[Backward deploy new
Power BI items to
previous stage](#)



[Update content
of app for the
stage](#)



Leverage the Deployment Pipelines APIs to perform functions such as:

- Checking deployment status & history
- Creating and Deleting Pipelines
- Assigning and Unassigning workspaces to stages
- Add and Remove Pipeline Users

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Introducing 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.



<https://azure.com/devops>

Automate Deployment Pipelines with Azure DevOps

Automating Deployment Pipelines enables agility across your organization's **CI/CD approach** by applying techniques such as scheduled deployments, reusable releases to your Power BI content management

There are **2 core methods** to achieve this:

- Azure DevOps Integration
- Power BI Rest APIs

With **Azure DevOps**, PowerShell or Power BI Automation Tools can be used to facilitate the automation tasks.

- **Power BI Automation Tools** use a service connection to Azure DevOps is established with a service principal or username & password
- **PowerShell** uses a service principal or user through the script to facilitate the deployment and get notified about its completion status



Power BI Automation Tools are an open-source alternative to APIs and Scripts with individual operations such as create a pipeline, assign workspace, etc.



Leverage the Power BI Developer Samples for PowerShell Scripts to automate selective deployment, end to end backwards deployment, etc.

Azure Pipelines Marketplace

VisualStudio | Marketplace

Azure DevOps > Azure Pipelines > Power BI automation tools

Power BI automation tools

Microsoft | 2,621 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

1.1.0: General Availability release

- Add datamarts support for "Deploy content" task
- Better error tracing

VisualStudio | Marketplace

Azure DevOps > Azure Pipelines > Power BI Actions

Power BI Actions

Maik van der Gaag | 8,545 installs | ★★★★★ (29) | Free

Build and Release Management tasks for Power BI.

[Get it free](#)

[Overview](#) [Q & A](#) [Rating & Review](#)

[Buy me a coffee](#)

Power BI Actions is a task for Azure Pipelines. With this tasks you can automate specific tasks for Power BI.

The following tasks can be automated by using this extension:

- Upload / Import Power BI dashboard (pbix file).
- Upload / Import Power BI dashboard and skip report (pbix file).
- Create a Power BI workspace.
- Remove a Power BI workspace.
- Add a new Admin user to a Power BI workspace.
- Add a Service Principal to a Power BI workspace.

DEMO 2 – Azure DevOps & Power BI Automation Tools

The screenshot shows the Azure DevOps Pipelines interface for a project named "MyPBIDevOps". The pipeline is titled "PBI Automation". The left sidebar shows navigation options like Overview, Repos, Pipelines, Environments, Releases, Library, Task groups, Deployment groups, and Compliance. The main area displays the pipeline structure:

- Tasks:** Pipeline, Get sources, Agent job 1, Publish PBIX, DEV to UAT, UAT to PRD.
- DEV to UAT Task Configuration:**
 - Display name: DEV to UAT
 - Power BI service connection: Casteres@M365x02668537.onmicrosoft.com
 - Pipeline: PBIAutomation
 - Target stage: Test
 - Checkboxes:
 - Next task starts only after the deployment is completed
 - 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, and Output Variables sections are collapsed.

Boîte de réception - r.casteres@... | Dashboard - Microsoft Azure | Projects - Home | Power BI | +

https://dev.azure.com/MyPBIDevOps/

Azure DevOps

Search

RC

MyPBIDevOps

Projects My work items My pull requests

+ New project

Filter projects

1 PBI Automation Power BI automation tools for Azure DevOps

2 PBI DataOps From DEV to UAT to PROD using PowerShell, Power BI API and Deployment Pipelines

34 more organizations

New organization

1 PBI Automation Power BI automation tools for Azure DevOps

4 PBI BPA Tabular Editor, BIM, BPA

2 PBI DataOps From DEV to UAT to PROD using PowerShell, Power BI API and Deployment Pipelines

3 PBI Validation Test DAX Query Validation

Organization settings

File Edit Selection View Go Run Terminal Help

PBI Automation - Visual Studio Code

EXPLORER

PBI AUTOMATION

- azure-pipelines.yml
- README.md
- Sales Pipeline Power BI.pbix

OUTLINE

Timeline

Get data

Power BI | +

https://app.powerbi.com/pipelines/3566f599-8c32-4b8a-be41-e2f2e787c47c

Power BI Compliance Manag... Home - Microsoft 3... Home - Microsoft A...

Power BI Deployment pipelines

PBIAutomation

Home Create Browse Data hub Metrics Apps Deployment pipelines Learn Workspaces My workspace

Development Learn more Test Learn more Production Learn more

1_DEV Deployed: 14/11/2022 2_UAT Deployed: 14/11/2022 3_PRD Deployed: 14/11/2022

Dataflows Datamart Deploy Dataflows Datamart Deploy Dataflows Datamart Update app

13:59 ENG FR 11/14/2022

What is your org's governance approach?



Approval Criteria &
Process

A formalized **checklist** to clarify standards that the Power BI content must meet in order to be approved and promoted to Production

Decision/Action:

- ✓ Agree on and document your approval criteria which may include compliance with Org Development Standards, Data Policies, etc.
- ✓ Establish the intake process to request CI/CD approval via your IT Service Management Tool and communicate to Power BI creators.



CI/CD Approvals

For many organizations, the **approvers** may be Power BI Workspace Admins. However, in some cases approvers may include stakeholders from the Power BI, DevOps, and Data Governance Team to provide a holistic approach.

Decision/Action:

- ✓ Ensure approvers and developers understand the approval guidelines through training and reinforcement
- ✓ Incorporate CI/CD FAQs and knowledge articles into knowledge base with an identified owner to update knowledge periodically.

What is your org's governance approach?



Power BI Content and
Access Management

Access to Power BI reports or deployment pipelines can be managed **across both the CI/CD pipeline and Power BI Portal** when automating deployments

- Required API permissions for the CI/CD Pipeline service account:
 - Create/manage workspaces, Publish / Deploy / Edit artifacts.
- Required permissions for the CI/CD Pipeline developer:
 - Create/Manage Azure DevOps organization and Projects.
 - Access to Azure Key Vault
- Workspace Member permissions that allow managing Datasets, Dataflows and other artifacts

Decision/Action:

- ✓ Extend pipeline and workspace permissions to the service principal or users to provide *enough access & resilience* to facilitate deployment across Dev-Test-Prod
- ✓ Decide if all deployments should be routed through CI/CD, and if Power BI deployments made via Power BI Deployment Pipelines page will be unauthorized.

Roles & Responsibilities: CI/CD Key Roles



Power BI Developer (CI/CD Requestor)

Role Quote:

"I develop Power BI content that is managed by continuous updates to meet Business requirements."

Skills & Training:

- Monitor performance of Power BI content and make changes *as needed* throughout its lifecycle
- Develop Power BI Content following data & development standards



Power BI Content Approver (CI/CD Approver)

Role Quote:

"I manage approvals of Power BI deployments based on our compliance requirements."

Skills & Training:

- Define & Adapt governance for CI/CD deployments
- Understand and enforce org guidelines on Power BI data & development standards



Power BI Deployment Pipeline Admin (CI/CD Pipeline Admin)

Role Quote:

"I ensure that deployments are performed in an efficient and automated way."

Skills & Training:

- Perform Deployments via Azure DevOps & Troubleshoot Pipeline functions
- Establish CI/CD environment including workspaces, access, etc.

Managing Deployment Operations



Development

- Workspace Admin
- Dataset Owner
- Pipeline Access (View, Share, Edit & Delete Pipeline)
- Workspace Viewer
- Workspace contributor
- Git Repo Access

Test

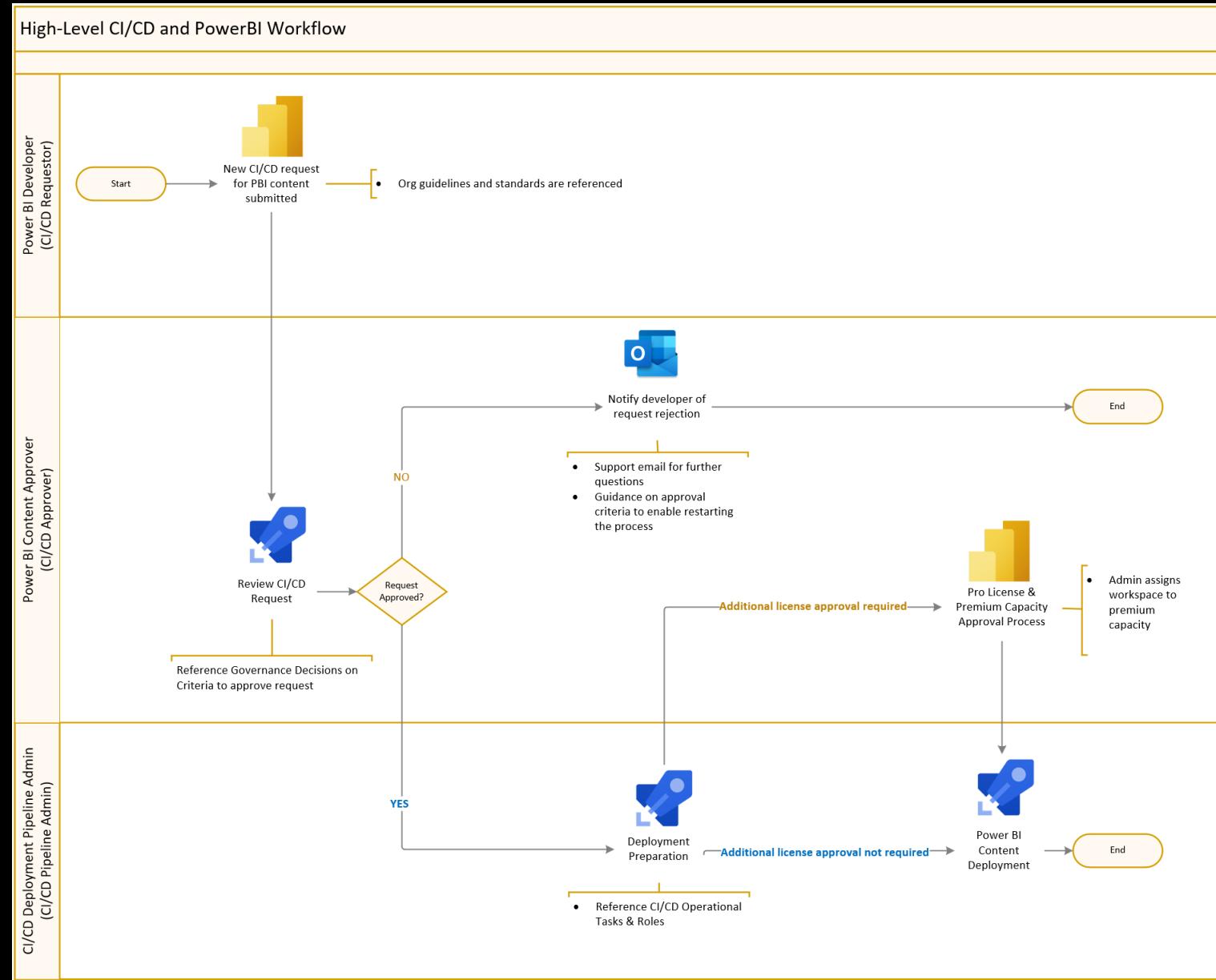
- Workspace Admin
- Dataset Owner
- Pipeline Access
- Workspace Viewer
- Workspace Viewer

Production

- Workspace Admin
- Dataset Owner
- Pipeline Access
- Workspace Viewer
- Workspace Viewer

Decision/Action: How do you plan to [manage access](#) across each stage?

High-Level CI/CD and Power BI Approval Workflow



DEMO 3 – Customizable DevOps Pipeline with PowerShell

The screenshot shows the Azure DevOps Pipelines interface for a project named "MyProject".

Run Summary:

- Triggered by: Romain Casteres
- Repository and version: PBI DataOps, main branch, commit Saa74664
- Time started and elapsed: Today at 2:56 PM, 3m 28s
- Related: 0 work items, 0 artifacts

Warnings (9):

- The workspace named MyProject2 [DEV] already exists.
- No values registered on the PublisherEmail or APP_ID variables on the YAML.
- Group/User already added to workspace: MyProject2 [DEV].
- The workspace named MyProject2 [TEST] already exists.
- No values registered on the PublisherEmail or APP_ID variables on the YAML.
- Group/User already added to workspace: MyProject2 [TEST].
- The workspace named MyProject2 [PROD] already exists.
- No values registered on the PublisherEmail or APP_ID variables on the YAML.
- Group/User already added to workspace: MyProject2 [PROD].

Stages:

- Deploy to Development... (1 job completed, 41s, 1 check passed)
- Deploy to Test Enviro... (1 job completed, 51s, 1 check passed)
- Deploy to Production... (1 job completed, 47s, 1 check passed)

Approval:

- Resource: Test (Approved)
- Requirement: All approvers must approve (Romain Casteres Approved • 13m ago)
- Ok for UAT

MyPBIDevOps

+ New project

[Projects](#) [My work items](#) [My pull requests](#)

Filter projects

CEandS

anneleoni

aidemos

34 more organizations

New organization

2

PBI DataOps

From DEV to UAT to PROD using PowerShell, Power BI API and Deployment Pipelines

1

PBI Automation

Power BI automation tools for Azure DevOps

3

PBI Validation Test

DAX Query Validation

4

PBI BPA

Tabular Editor, BIM, BPA



Agenda

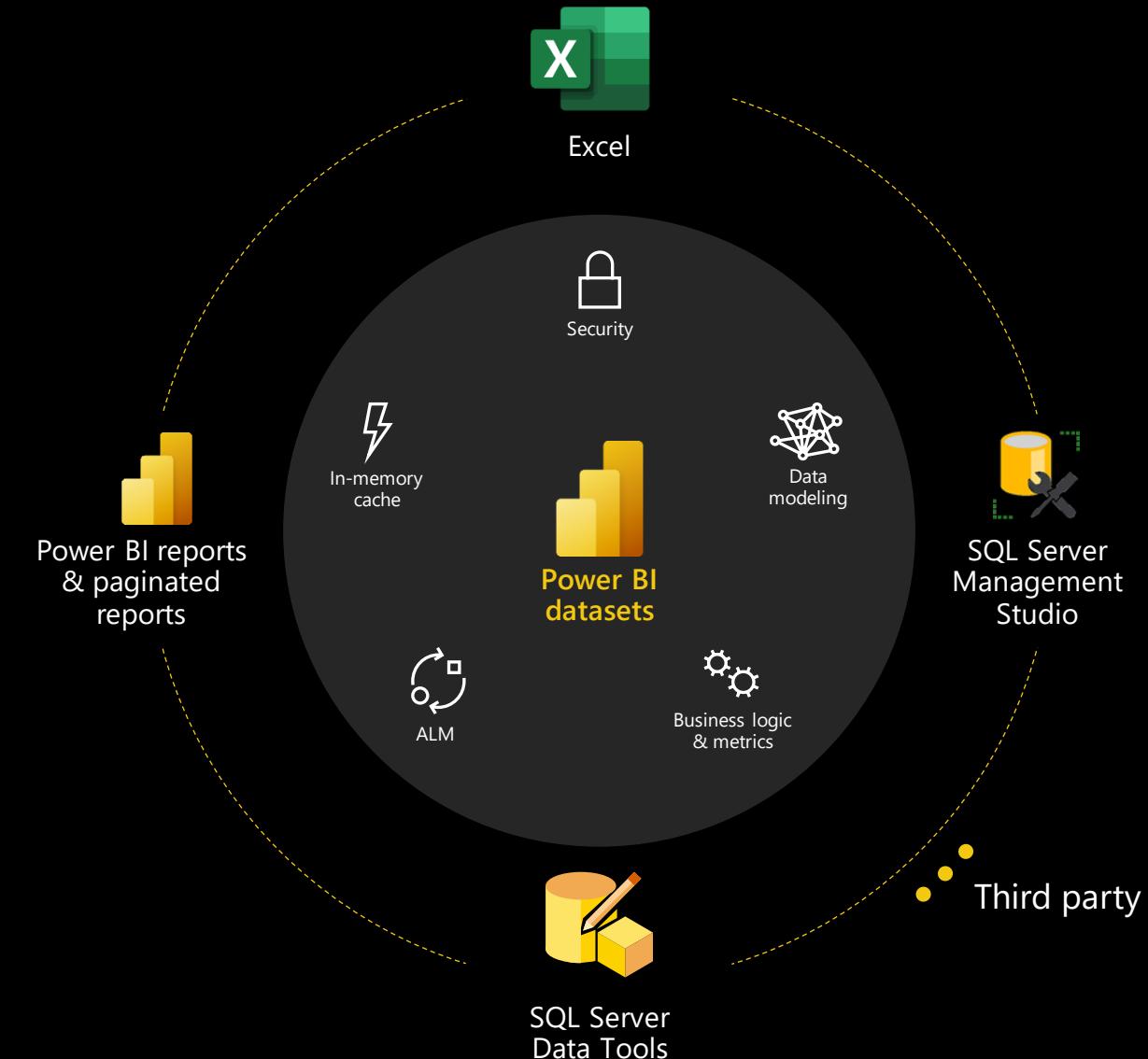
1. DevOps & DataOps Concepts
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Open semantic models – XMLA Endpoint

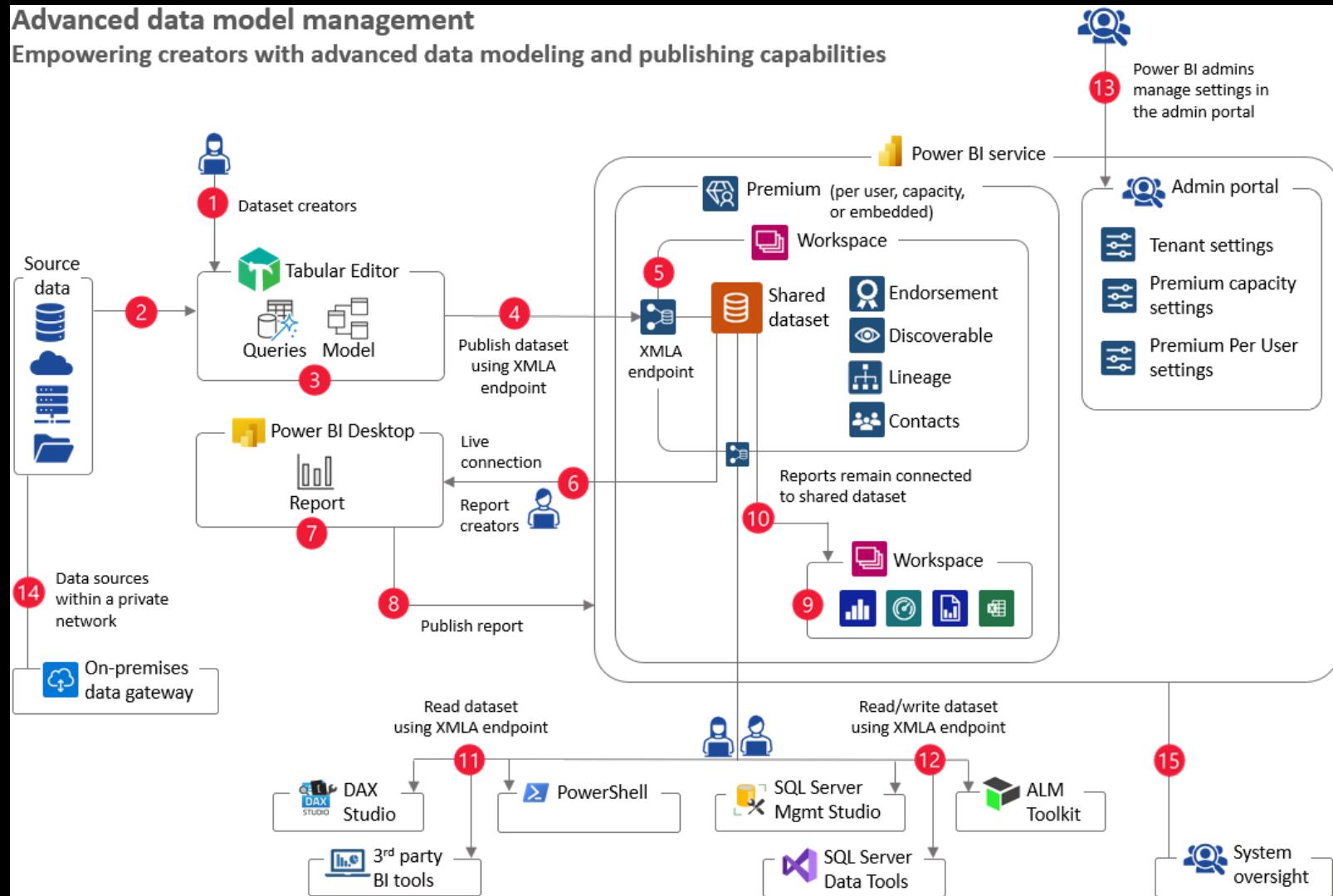
Read-only capability for the XMLA endpoint provides open-platform connectivity for Power BI datasets compatible with a range of data visualization tools from different vendors

Read/write capabilities support many additional scenarios for dataset management, advanced semantic modeling, debugging, and monitoring

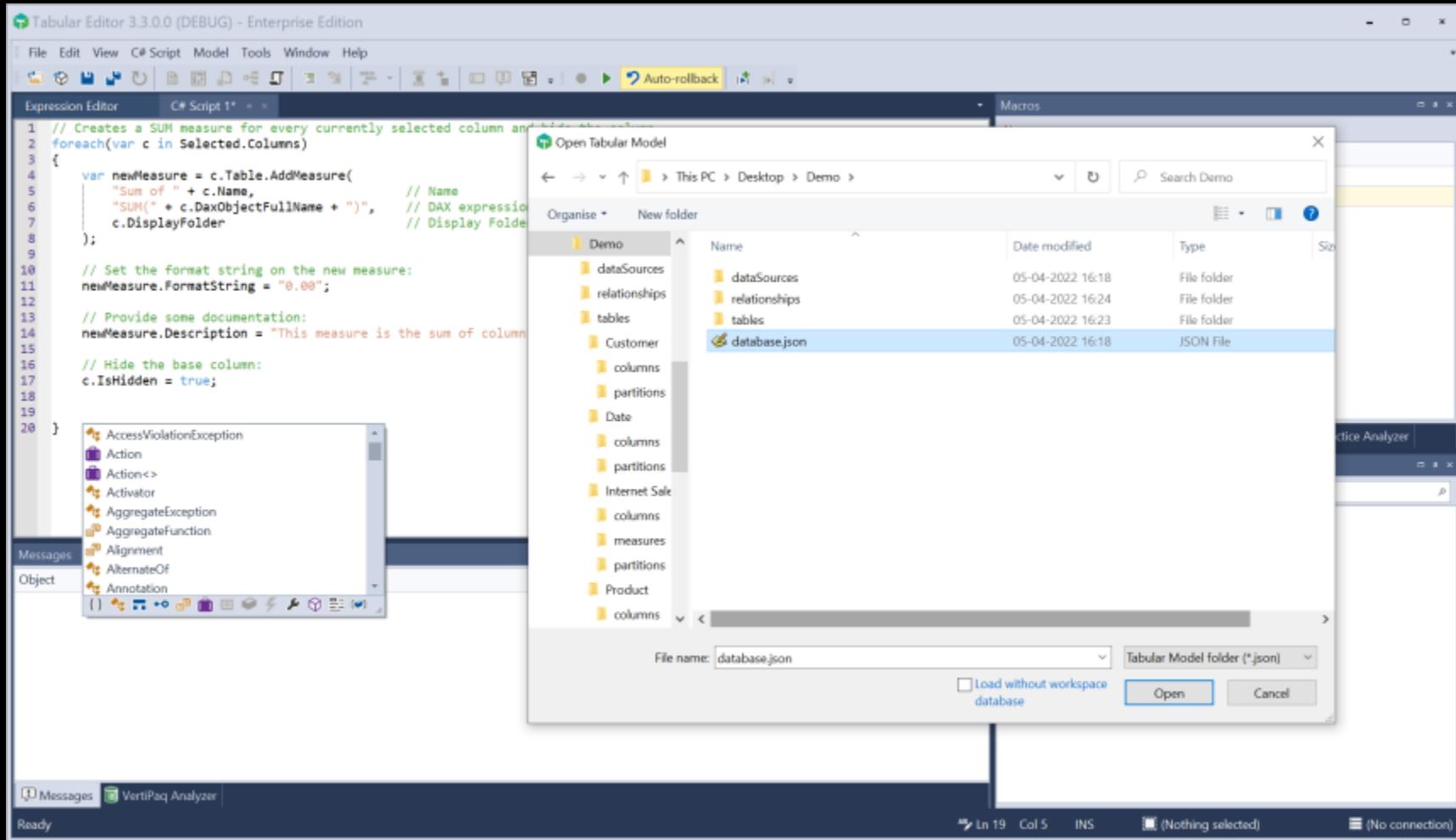
With XMLA Endpoint, you can refresh more than 48 / days for incremental refresh, push data, ...



Advanced Data Model Management



Data Model metadata as a Folder



- Save model metadata as a folder structure for better version control integration
- Command line tool for build and deployment automation
- Improve model quality with the Best Practice Analyzer
- Workspace mode for improved development workflow

Compare Data Model

ALM Toolkit for Power BI

File Home Help

Compare Actions Validate Selection Update Generate Script Options Report Differences

Source: asazure://southcentralus.asazure.windows.net/chwade003;AdventureWorksDW

Target: asazure://southcentralus.asazure.windows.net/chwade003;AdventureWorks3

MAQ Software Power BI

Type	Source Name	Status	Target Name	Action
Data Source	SQL/localhost\SP1;AdventureWorksDW	Different Definitions	SQL/localhost\SP1;AdventureWorksDW	Update
Expression	RangeEnd	Missing in Target		Create
Expression	RangeStart	Missing in Target		Create
Table	DimCustomer	Same Definition	DimCustomer	Skip
Relationship	'DimCustomer'[GeographyKey]->'DimGeography'[GeographyKey]	Same Definition	'DimCustomer'[GeographyKey]->'DimGeography'[GeographyKey]	Skip
Table	DimDate	Different Definitions	DimDate	Update
Measure	DaysCurrentQuarterToDate	Same Definition	DaysCurrentQuarterToDate	Skip
Measure	DaysInCurrentQuarter	Same Definition	DaysInCurrentQuarter	Skip
Table	DimEmployee	Different Definitions	DimEmployee	Update
Table	DimGeography	Same Definition	DimGeography	Skip
Table	DimProduct	Same Definition	DimProduct	Skip
Relationship	'DimProduct'[ProductSubcategoryKey]->'DimProductSubcategory'[ProductSubcategoryKey]	Same Definition	'DimProduct'[ProductSubcategoryKey]->'DimProductSubcategory'[ProductSubcategoryKey]	Skip
Measure	ProductCount	Missing in Source		Delete
Table	DimProductCategory	Same Definition	DimProductCategory	Skip
Table	DimProductSubcategory	Same Definition	DimProductSubcategory	Skip
Relationship	'DimProductSubcategory'[ProductCategoryKey]->'DimProductCategory'[ProductCategoryKey]	Same Definition	'DimProductSubcategory'[ProductCategoryKey]->'DimProductCategory'[ProductCategoryKey]	Skip
Table	FactInternetSales	Missing in Target		Create
Relationship	'FactInternetSales'[CustomerKey]->'DimCustomer'[CustomerKey]	Missing in Target		Create
Relationship	'FactInternetSales'[DueDateKey]->'DimDate'[DateKey]	Missing in Target		Create
Relationship	'FactInternetSales'[OrderDateKey]->'DimDate'[DateKey]	Missing in Target		Create
Relationship	'FactInternetSales'[ProductKey]->'DimProduct'[ProductKey]	Missing in Target		Create
Relationship	'FactInternetSales'[ShipDateKey]->'DimDate'[DateKey]	Missing in Target		Create
Measure	InternetCurrentQuarterMargin	Missing in Target		Create
Measure	InternetCurrentQuarterSales	Missing in Target		Create

```
1 {
2   "type": "structured",
3   "name": "SQL/localhost\SP1;AdventureWorksDW",
4   "connectionDetails": {
5     "protocol": "tds",
6     "address": {
7       "server": "CHWADEAGGS\SAT\SP1",
8       "database": "AdventureWorksDW"
9     },
10    "authentication": null,
11    "query": null
12  }
13 }
```

```
1 {
2   "type": "structured",
3   "name": "SQL/localhost\SP1;AdventureWorksDW",
4   "connectionDetails": {
5     "protocol": "tds",
6     "address": {
7       "server": "chwadeaggs.database.windows.net",
8       "database": "chwadeAW"
9     },
10    "authentication": null,
11    "query": null
12  }
13 }
```

ALM Toolkit - finished comparing datasets

DEMO 4 – Advanced DevOps Pipeline with DAX & BPA

The image displays two screenshots of the Azure DevOps Pipelines interface.

Left Screenshot (Failed CI Run):

- Project:** MyPBIDevOps / MyPBIDevOps3 / Pipelines / DataOpsCI-Part5 / 20221108.10
- Status:** Failed (red circle)
- Triggered by:** Romain Casteres
- Repository and version:** MyPBIDevOps3 / part5 (commit 33687474)
- Time started and elapsed:** Tue at 4:58 PM (54s)
- Errors:** 3 (Failed! Test Table: MarvelFact Count should be exact. Expected: 999999 != 16376)

Right Screenshot (Successful ASBuild Run):

- Project:** TabularModel / Pipelines / ASBuild / 32
- Status:** Success (green circle)
- Jobs in run #32:**
 - Agent job 1 (1m 11s):
 - Initialize job (6s) - Success
 - Checkout Tabul... (12s) - Success
 - Secure Supply C... (11s) - Success
 - Initialize CodeQL... (4s) - Success
 - Step 0 - Downloa... (9s) - Success
 - Step 1 - Best Pr... (19s) - Warning
 - Step 2 - Schema ... (2s) - Failed
 - Step 3 - Validati... (<1s) - In Progress
 - Step 4 - Create ... (<1s) - In Progress
 - Publish Artifact (<1s) - In Progress
 - Component De... (<1s) - In Progress
- Logs:** Step 1 - Best Practice Analysis

```
1 Starting: Step 1 - Best Practice Analysis
2 =====
3 Task      : Command line
4 Description: Run a command line script using Bash on Linux and macOS and cmd.exe on Windows
5 Version   : 2.201.1
6 Author    : Microsoft Corporation
7 Help      : https://docs.microsoft.com/azure/devops/pipelines/tasks/utility/command-line
8 =====
9 Generating script.
10 =====
11 ===== Starting Command Output =====
12 "C:\Windows\system32\cmd.exe" /D /E:ON /V:OFF /S /C "CALL "D:\a\_temp\2390d8a6-87d5-4fb5-881d-6e8de...
13 
14 Tabular Editor 2.12.4 (build 2.12.7563.29301)
15 -----
16 Dependency tree built in 267 ms
17 Loading model...
18 Running Best Practice Analyzer...
19 =====
20 ##[warning]Column 'Internet Sales'[Unit Price Discount Pct] violates rule "[Performance] Do not use floating point data type"
21 ##[warning]Column 'Product'[Weight] violates rule "[Performance] Do not use floating point data type"
22 ##[warning]Column 'Promotion'[DiscountPct] violates rule "[Performance] Do not use floating point data type"
23 ##[warning]Column 'Reseller Sales'[Unit Price Discount Pct] violates rule "[Performance] Do not use floating point data type"
24 ##[warning]Column 'Currency'[CurrencyKey] violates rule "[Performance] Set IsAvailableInMdx to false"
25 ##[warning]Column 'Customer'[CustomerKey] violates rule "[Performance] Set IsAvailableInMdx to false"
26 ##[warning]Column 'Customer'[GeographyKey] violates rule "[Performance] Set IsAvailableInMdx to false"
```

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PBI BPA

Tabular Editor, BIM, BPA

* * * * *

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PBI Validation Test

DAX Query Validation

* * * * *

2

PBI DataOps

From DEV to UAT to PROD using PowerShell, Power BI API and Deployment Pipelines

* * * * *

1

PBI Automation

Power BI automation tools for Azure DevOps

* *

Highlighting data model changes easily

The screenshot shows the Azure DevOps interface for a project named "PBI BPA". The left sidebar has a "Commits" section selected. The main area displays a commit titled "DAX Change" with the ID "3b5ca047". The commit was made by "Romain" on Nov 14, 2018, on the "main" branch, and it failed. The "Files" tab is selected, showing a diff view for "Total Sales.json". The diff highlights changes in the DAX expression for calculating total sales.

DAX Change
3b5ca047 Romain committed Nov 14 main failed

Files Details

Parent 1 → This commit Filter 2 changed files

PBI BPA

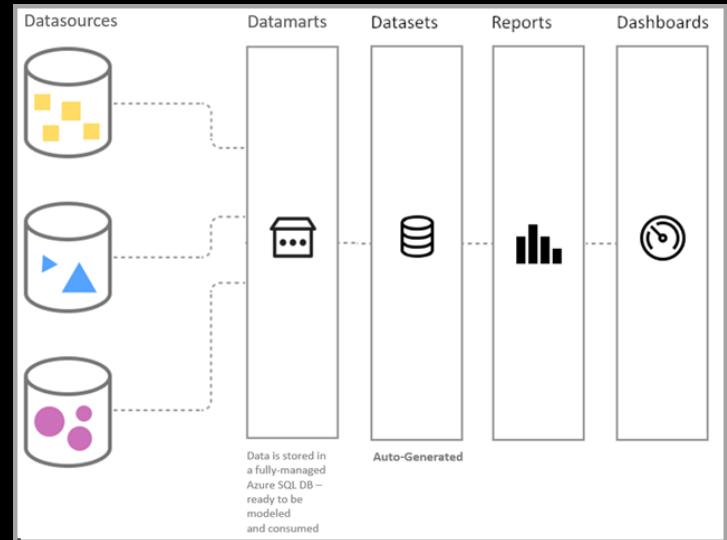
AdventureWorks
tables/Sales Territory/measures
Total Sales.json
database.romainca.tmuo

Total Sales.json -1+1
/AdventureWorks/tables/Sales Territory/measures/Total Sales.json

```
1 1 {  
2 2   "name": "Total Sales",  
3 3   "expression": "([Reseller Total Sales] + [Internet Total Sales]) / 100",  
4 4   "expression": "([Reseller Total Sales] + [Internet Total Sales])",  
5 5   "formatString": "\$\#,0.00;(\$\#,0.00);\$\#,0.00",  
6 6   "annotations": [  
-- --
```

Best Practices

- Get Version Control
- Separate Reports From the Model (ETL – Data Model – Report)
- Test:
 - The presence of a value in a column that shouldn't be there
 - Number of rows in a fact table / dimension
 - The existence of blank columns
 - The values in a custom column are correct
- Institute Workspace [Governance](#)
- Have a Test Dataset (Only code change)
- No Data within Code Repository
- It's possible to [Backup](#) Power BI Dataset
- [Monitor](#) & Foster a Power BI [Center of Excellence](#)



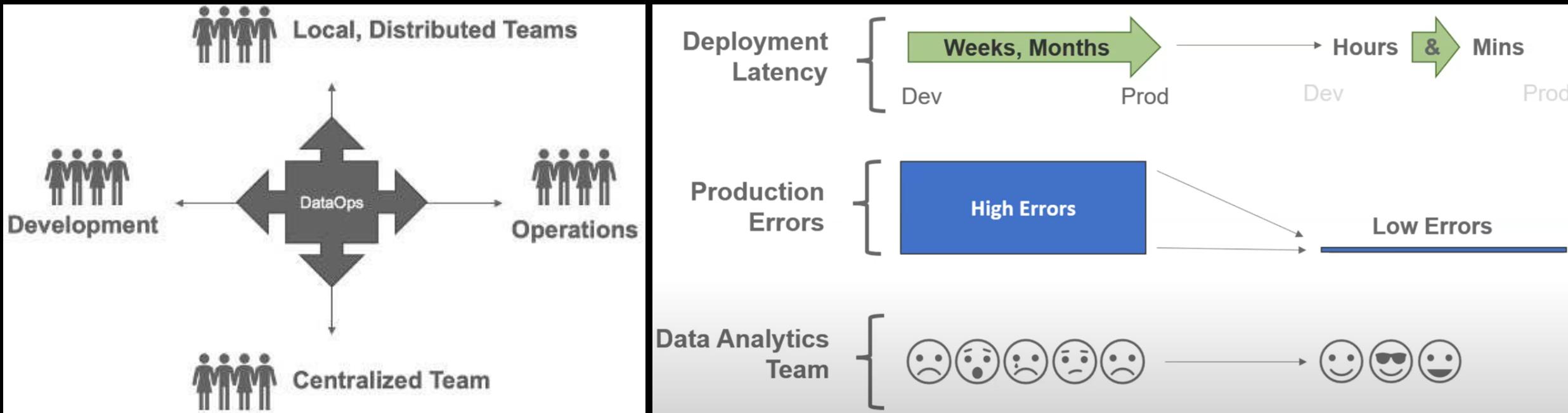
A screenshot of the Power BI DAX Query Editor. The interface includes a toolbar with various icons like Run, Cancel, Clear Cache, Undo, Redo, Copy, Paste, and a Query Builder button. The main area shows a DAX query script:

```
File Home Advanced Help
Run Cancel Clear Cache Output View Edit DAX Format Query A To Upper a To Lower Comment Find Replace Power BI All Queries Query Plan Server Timings Connect Refresh Metadata
MeasureTests.msdax CalculatedColumnsTests.msdax
Metadata 13a31687-ba24-4920-8b5c Model
AlignmentDim DateDim EyeColorDim MarvelFact MarvelSource
ROW ("TestName", "Measure: Running Total of Appearances should not be altered by Alignment Filter", "ExpectedValue", TRUE, "ActualValue", _RunningTotalofAppearswithAlign = _RunningTotalofAppearswithoutAlign)
, ROW ("TestName", "Measure: Top Rank in Appearances for Good Alignment should be Spider-man", "ExpectedValue", _SpidermanID, "ActualValue", _GoodRankofCharAppearances)
, ROW ("TestName", "Measure: Top Rank in Appearances for Neutral Alignment should be Wolverine", "ExpectedValue", _WolverineID, "ActualValue", _NeutralRankofCharAppearances)
, ROW ("TestName", "Measure: Date Filter should output 'between January, 2010 and June, 2011'", "ExpectedValue", "between January, 2010 and June, 2011", "ActualValue", _MultipleDatesFilter)
, ROW ("TestName", "Measure: Single Date Filter should output 'for the month of June, 2011'", "ExpectedValue", "for the month of June, 2011", "ActualValue", _SingleDateFilter)
98 /*Output Pass/Fail*/
99 EVALUATE ADDCOLUMNS(_Tests,"Passed",[ExpectedValue] = [ActualValue])
100 %
```

The results pane at the bottom shows a table with four columns: TestName, ExpectedValue, ActualValue, and Passed. The table contains five rows of test results.

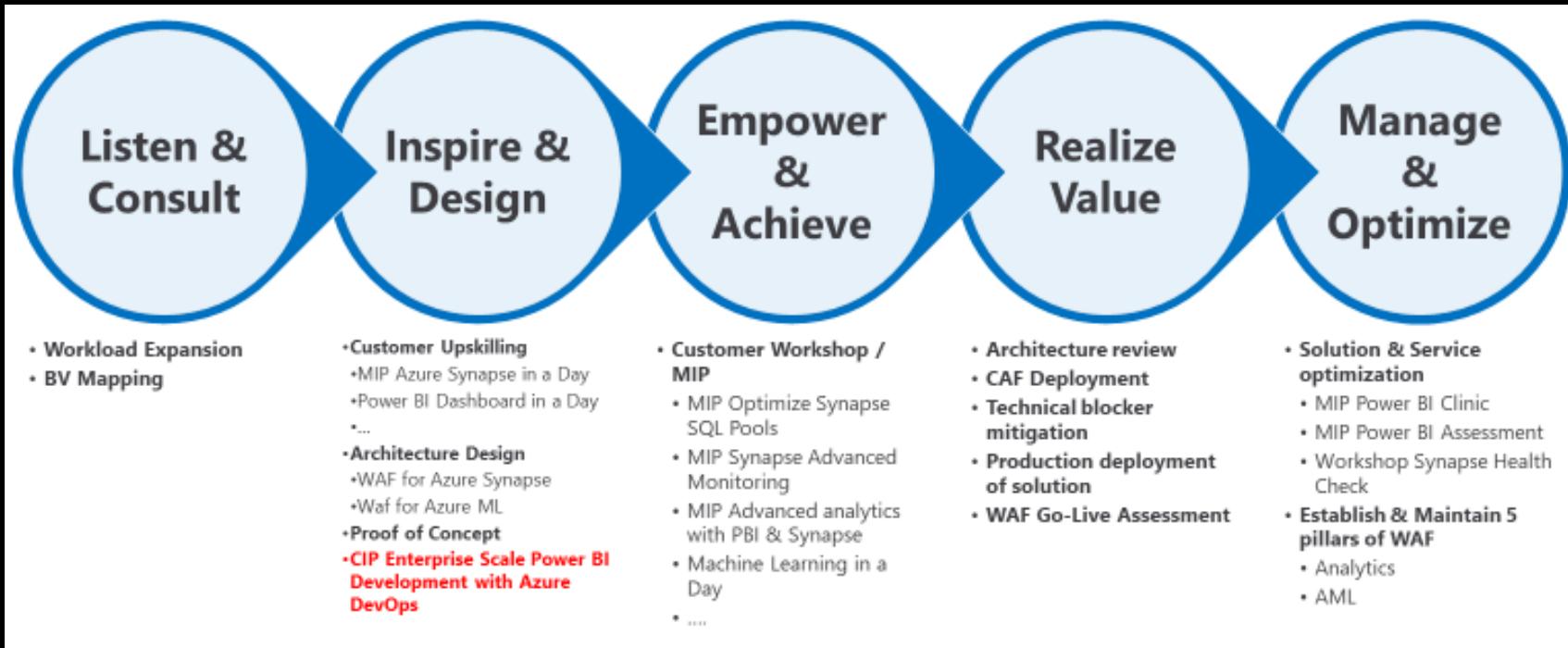
TestName	ExpectedValue	ActualValue	Passed
Measure: Running Total of Appearances should not be altered by Alignment Filter	TRUE	TRUE	True
Measure: Top Rank in Appearances for Good Alignment should be Spider-man	1678	1678	True
Measure: Top Rank in Appearances for Neutral Alignment should be Wolverine	64786	64786	True
Measure: Date Filter should output 'between January, 2010 and June, 2011'	between January, 2010 and June, 2011	between January, 2010 and June, 2011	True
Measure: Single Date Filter should output 'for the month of June, 2011'	for the month of June, 2011	for the month of June, 2011	True

DataOps Benefits



Resources

- Community tool [pbi-tools](#) can be used to review updates on the visuals (⚠ Not supported by Microsoft)
- [Release planner \(PREVIEW\)](#)
- PBI CAT :
 - Portal: [Power BI CAT Portal](#)
 - Teams: [PBICAT](#)
- PBI Community :
 - Teams: [Power BI Data-AI Team](#)
 - Meeting: Monthly Connect
- [Offerings Management](#)
 - <http://aka.ms/VBDFinder>
 - <http://aka.ms/vbdroadmap>



Enterprise Scale Power BI Development with Azure DevOps

Duration: 1 day [Onsite/Remote]

Focus Area: Availability and Business Continuity

Difficulty: 300 - Advanced

Intended Audience

The following roles will find this workshop useful. Others may also attend, as described in the secondary Audience section.

Primary Audience:

Power BI Report developers, Power BI Admins, Azure DevOps specialists, CI/CD Managers.

Secondary Audience:

Any Business Intelligence report developers.

Overview

The focus of this delivery is to provide the introductory knowledge and tools to start to benefit from the automation possibilities that exist by using Power BI REST APIs together with Azure DevOps and PowerShell, by teaching how to automate your organization's Power BI Deployment Pipelines with CI/CD.

Objectives

After completing this training, you will be able to:

- Manage your organization's Power BI Development and Deployment processes more effectively at scale through Azure DevOps.
- Benefit from GIT's branching and version control systems, storing the versions of each PBIX files being deployed.
- Set up Pipelines with CI/CD on Azure DevOps with automated workflows.

- Set up review and approval rules to each Power BI report deployment stage.
- Automate Power BI Management tasks with REST APIs and PowerShell.

Key takeaways

Course material

- Knowledge transfer session and slides.
- Demo Instructions and step-by-step guidance document.
- Exclusive PowerShell template scripts integrated with Azure DevOps features, alongside a YAML pipeline script template.

Agenda

This 1-day delivery includes a Knowledge Transfer session where all the concepts are introduced with a presentation, followed by a Demo of the solution which could be presented on a workshop format, or as a Proof of Concept.

Course details

Knowledge Transfer session

- Intro to Power BI Deployment Pipelines
- Intro to Power BI Rest APIs
- Deployment Automation with APIs and Azure DevOps
- Intro to related DevOps Concepts
- Best Practices & recommendations
- Governance Decisions

Demo / Proof of Concept

- Azure DevOps Environment configuration
- Power BI Environment configuration
- Roles and responsibilities

Pre-requisites

Before attending this course, it is recommended that you meet the following criteria

- Participants have previous experience with the Power BI Service, developing and publishing Power BI reports.
- Basic knowledge of Azure DevOps and Git.
- Be familiar with PowerShell scripts.

If you choose to perform the Proof of Concept on your own environment, make sure to have the following:

- Access to a Power BI Premium Capacity (or PPU or Embedded capacity).
- Permission to assign Power BI Pro licenses.
- Permission to create App Registrations on Azure AD.
- Access to an Azure Subscription.
- Permission to create / manage Azure DevOps organizations and projects.

For more information

Contact your Microsoft Account Representative for further details.



Thank you