Power BI API Extravaganza

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♡ Power BI & Data Architecture

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Slides here:

https://github.com/RuiRomano/sessionslides

Power BI API Extravaganza

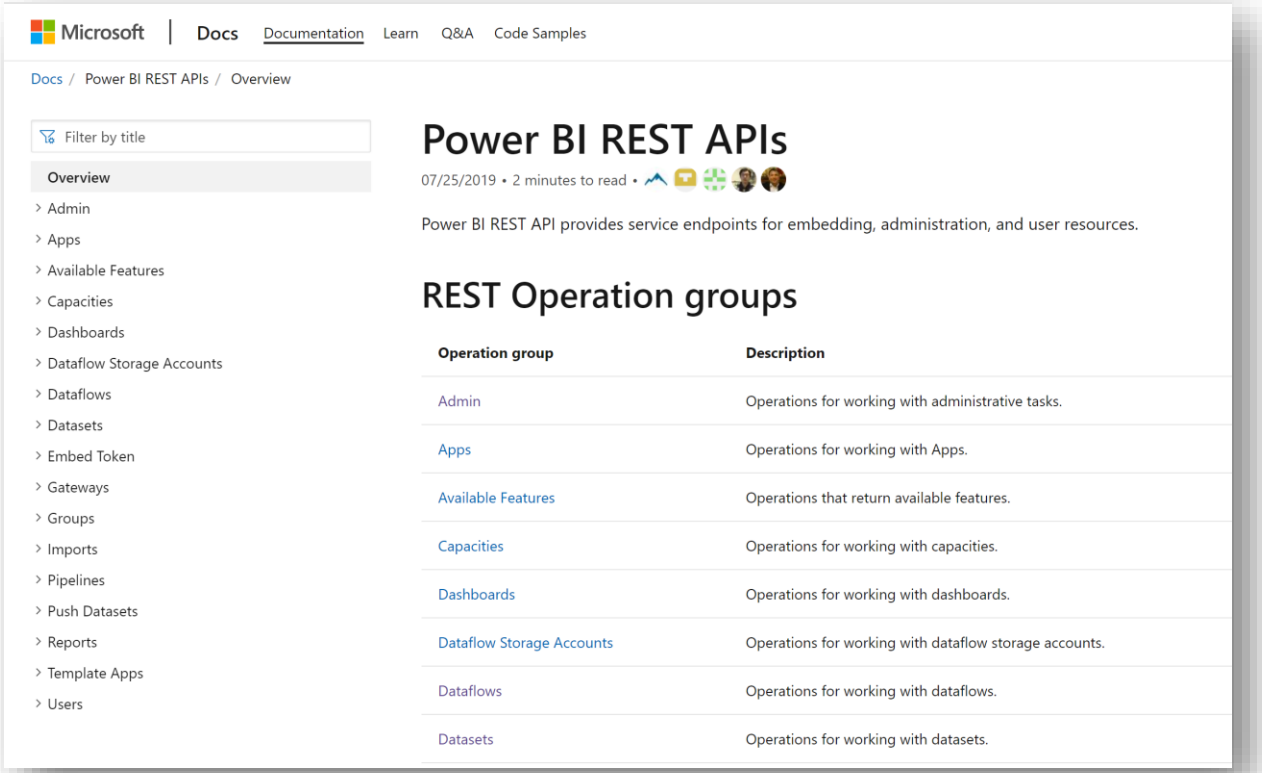
- Not a Power BI Intro!
- 100% focus on the REST API's
- Lots of powershell…
- Fast Paced ☺

Focus on the possibilities not details…

Power BI REST API's ?

Collection of REST API's for:

- Administration
- Monitoring
- Productivity / DevOps
- Real-Time
- Embedding

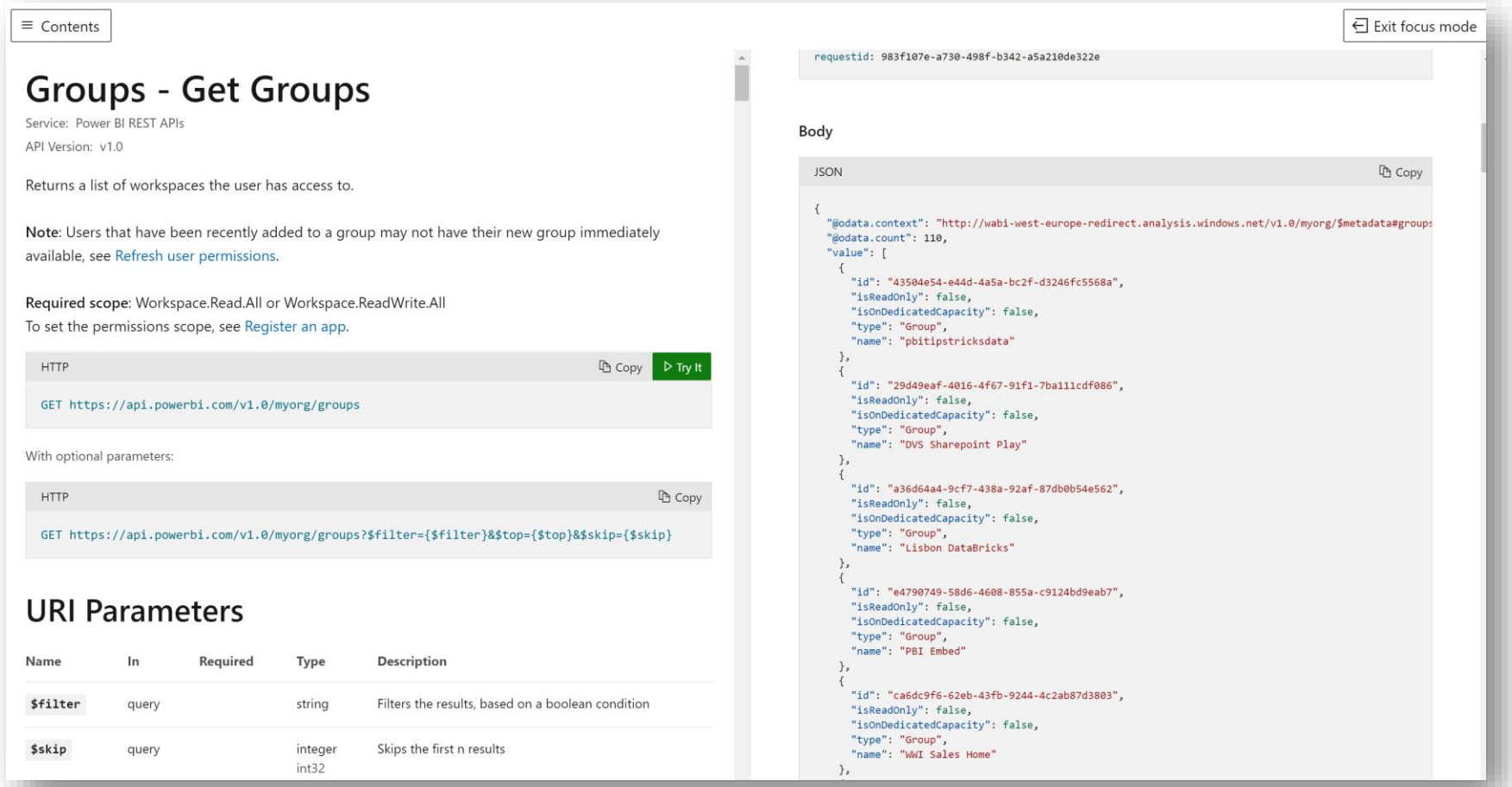


[Power BI REST APIs - Power BI REST API | Microsoft Docs]

Links: [PBI API Session]

How can I “play” with the API’s?

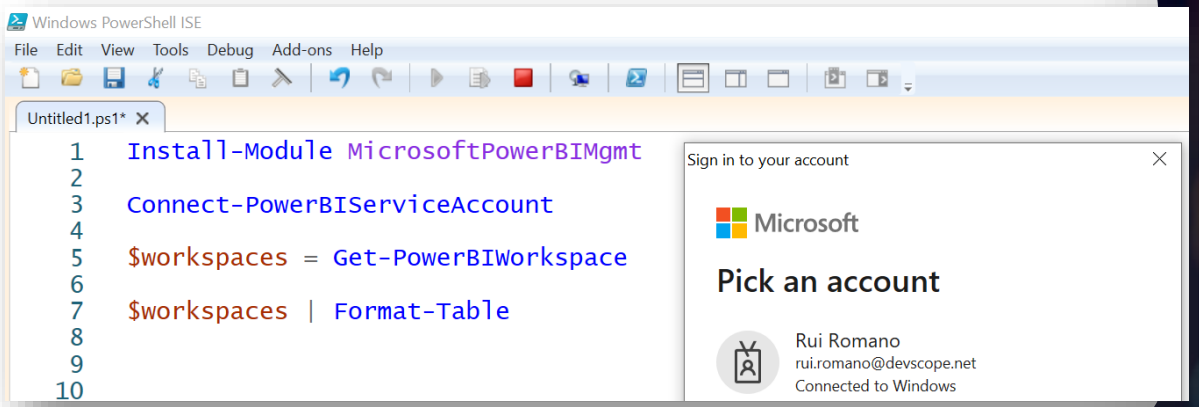
- Go to the Docs and “Try it” with your Power BI tenant data



How can I work with the API's?

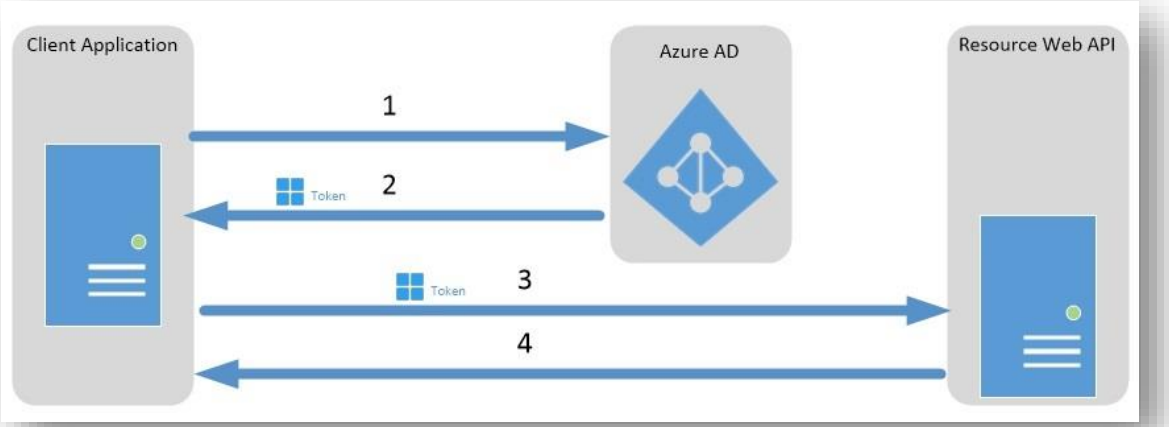
- You need to be comfortable with code/script/automation (power automate)
  Any language that can make an HTTP request is compatible: .Net, PowerShell, Python,…
- There are multiple libraries/packages available:
  PowerShell – MicrosoftPowerBIMgmt, PowerBIPS (♡)
  Python – python-power-bi
  .Net – Microsoft.PowerBI.Api
- If possible, use a Service Principal

Demo MicrosoftPowerBIMgmt



API Authentication

- OAuth 2.0
- Authentication Flows:



Authentication Flow	Interactive	Requirements
Client Credentials **(Recommended for non interactive)**	No	Azure AD Service Principal
Auth Code	Yes	Power BI Account

```
POST /token HTTP/1.1
Host: authorization-server.com

grant_type=client_credentials
&client_id=xxxxxxxxxx
&client_secret=xxxxxxxxxx
```

```
HTTP/1.1 200 OK
Content-Type: application/json
Cache-Control: no-store
Pragma: no-cache

{
  "access_token":"MTQ0NjJkZmQ5OTM2NDE1ZTZjNGZmZjI3",
  "token_type":"bearer",
  "expires_in":3600,
  "refresh_token":"IwOGYzYTlmM2YxOTQ5MGE3YmNmMDFkNTVk",
  "scope":"create"
}
```

Service Principal – Manual Step by Step

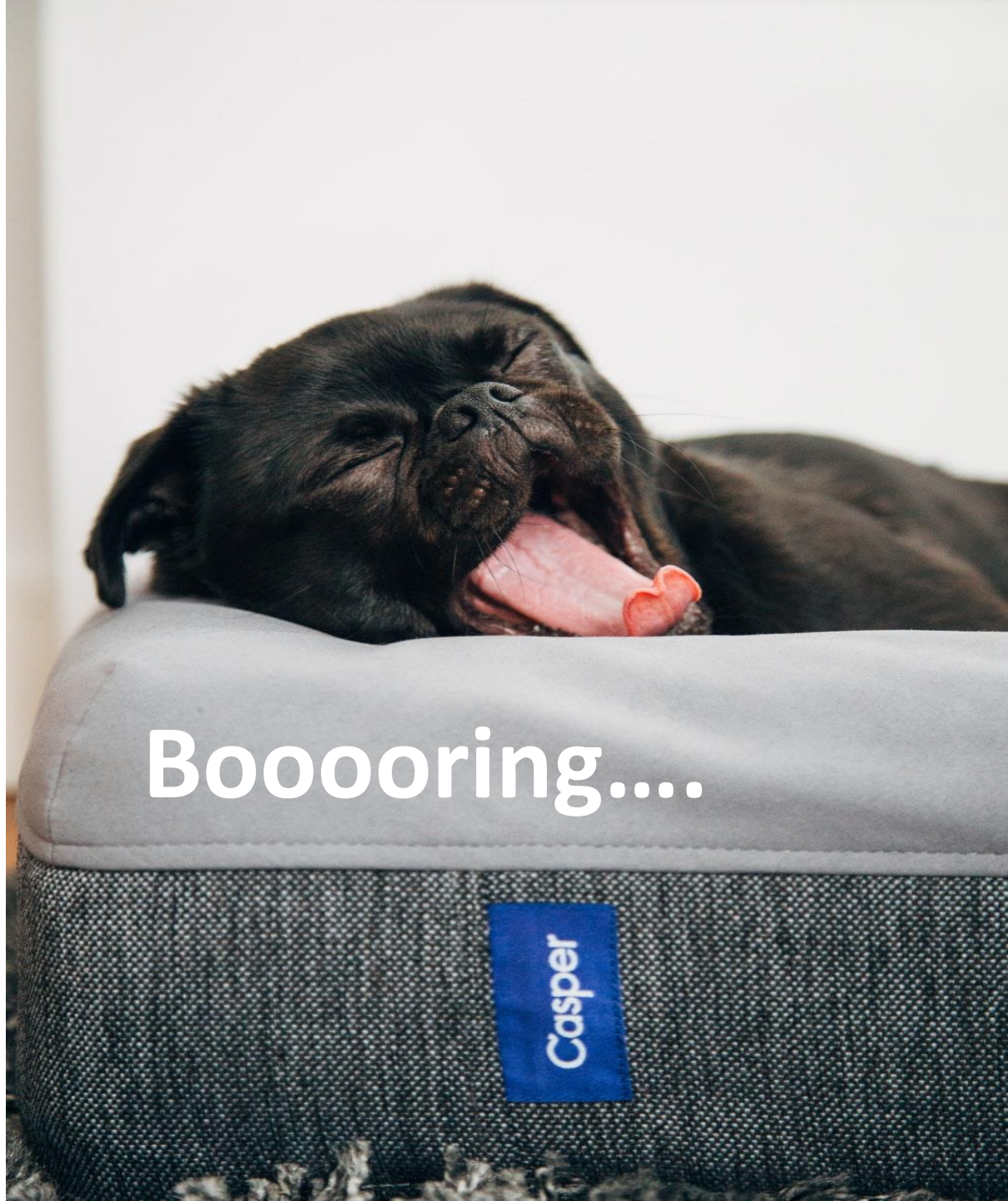
1. Go to Azure AD Active Directory
2. Go to App Registrations and create a new App (leave defaults)
3. Generate a new App Secret
4. Save the App Id, App Secret & Tenant Id
5. Create/Reuse an Azure AD Security Group
6. Add the Service Principal to the Security Group as a member
7. Authorize the Security Group in Power BI Admin Portal Tenant Settings:
   - Allow service principals to use Power BI APIs
   - Allow service principals to use read-only Power BI admin APIs – if admin calls are necessary (ex: monitoring)
   - Allow XMLA endpoints and Analyze in Excel with on-premises datasets (execute Queries)

Note: You don't need to add any Power BI API Permissions

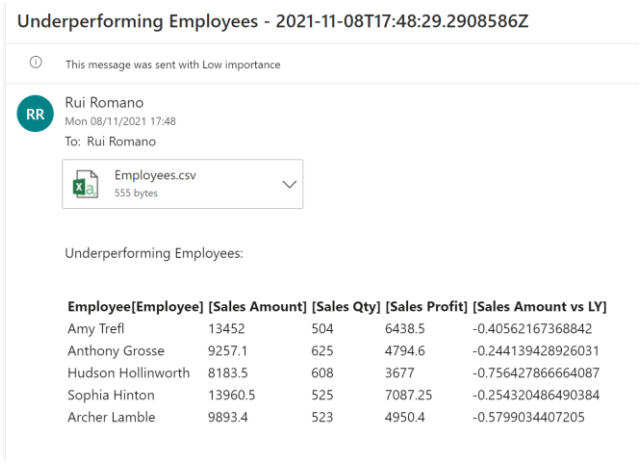
More info: link

Scenarios / Demos

- DAX Queries w/ REST API
- Monitoring
- Productivity / DevOps
- Realtime



Power BI Execute Queries API



Underperforming Employees - 2021-11-08T17:48:29.2908586Z

This message was sent with Low importance

RR Rui Romano
Mon 08/11/2021 17:48
To: Rui Romano

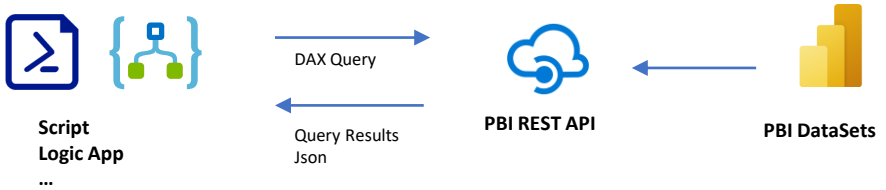
Employees.csv
555 bytes

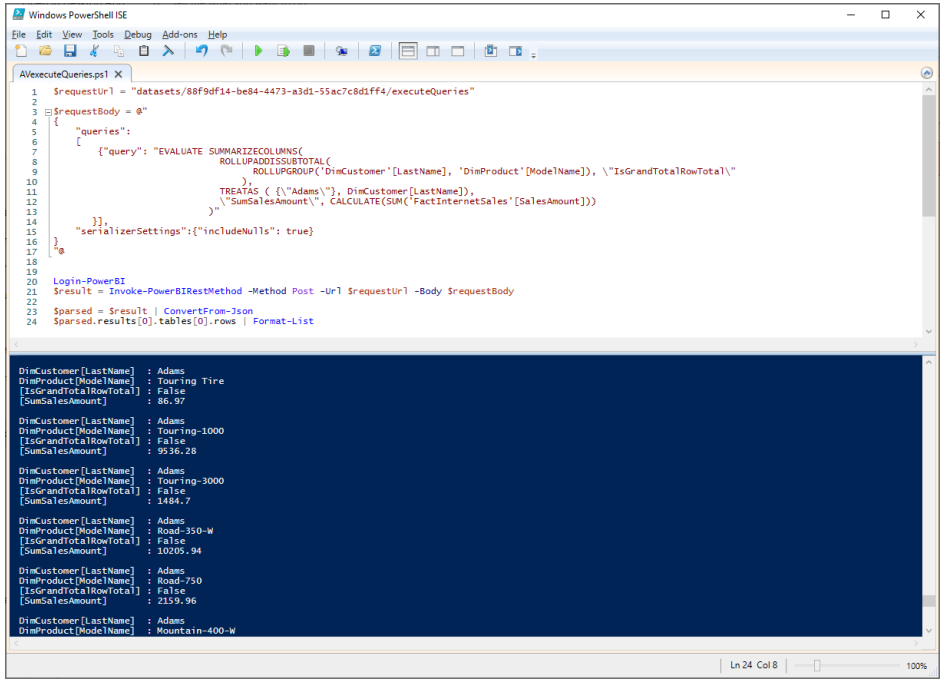
Underperforming Employees:

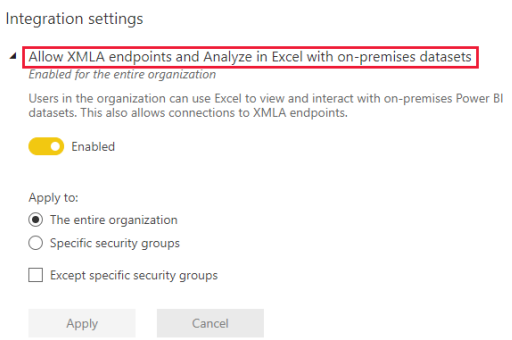
Employee[Employee]	[Sales Amount]	[Sales Qty]	[Sales Profit]	[Sales Amount vs LY]
Amy Trefl	13452	504	6438.5	-0.40562167368842
Anthony Grosse	9257.1	625	4794.6	-0.244139428926031
Hudson Hollinworth	8183.5	608	3677	-0.756427866664087
Sophia Hinton	13960.5	525	7087.25	-0.254320486490384
Archer Lamble	9893.4	523	4950.4	-0.5799034407205

REST API - Dataset Execute Queries

- The coolest API! ☺
- Works on Premium & **Shared (PRO)**
- Requirements
  "Build" permission on the dataset
  Enable Tenant Setting "Allow XMLA Endpoints and Analyse in Excel with on-premises datasets"
- Main Limitations
  Result sets capped to 100k rows
  No parallel queries





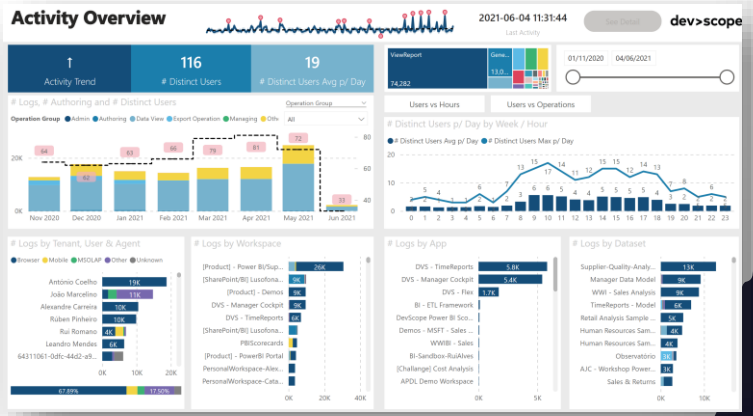


Download: here

Power BI Monitoring

Full session on the topic
[link]

Code & Slides
[link]

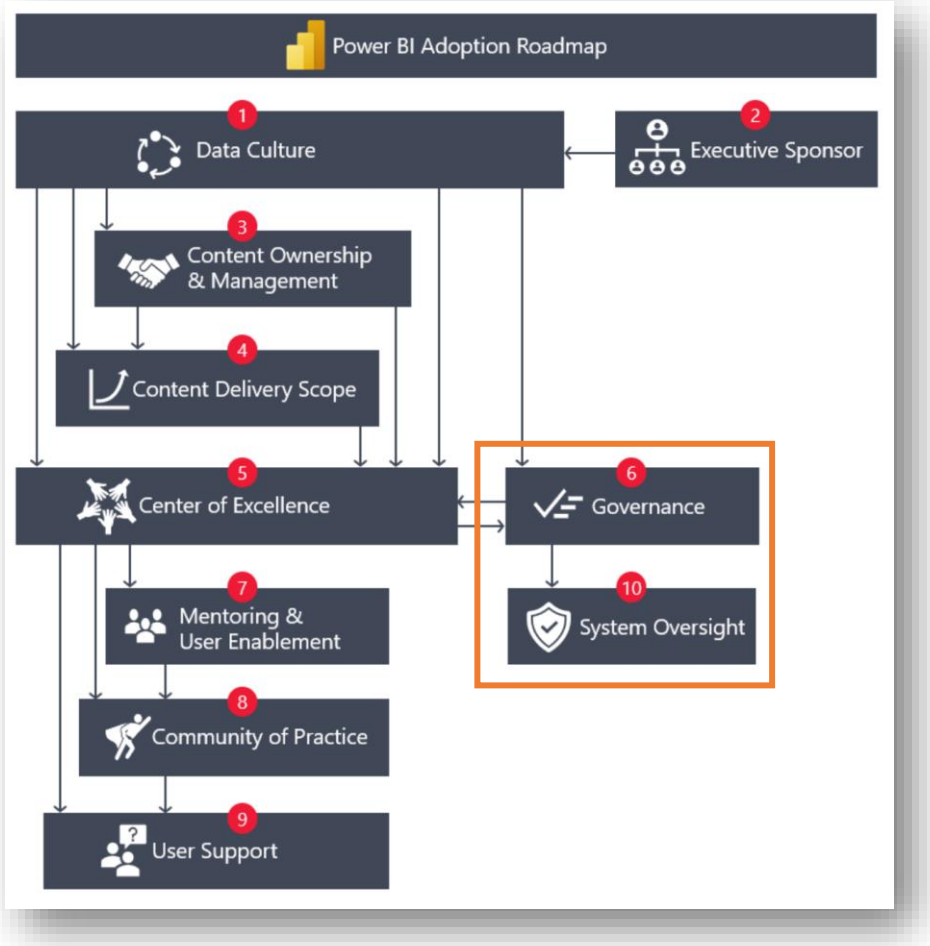


Why Monitoring?

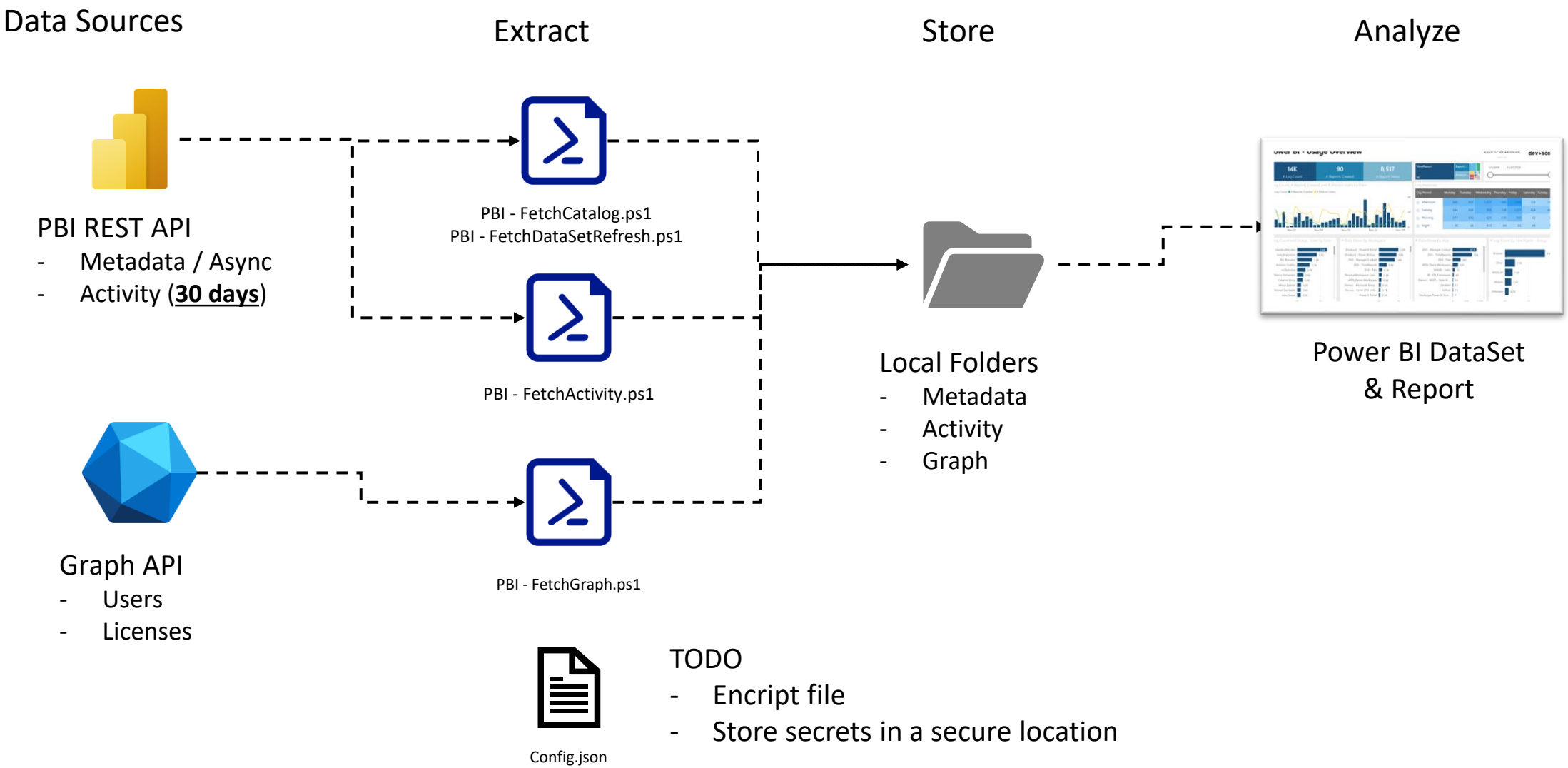
Power BI Monitoring is one of the pillars for a good Power BI Governance, allows you to:

- Focus on what really matters
- Detect Patterns
- Get Insights on Power BI Usage
- Anticipate Issues

[Power BI Adoption Roadmap]



How? – Simplest (Easiest)



How? – Azure (Recommended)

Data Sources

Extract

Store

Analyze

PBI REST API
- Metadata / Async
- Activity (**30 days**)

Graph API
- Users
- Licenses

Azure Function

Key Vault

App Insights

Azure Storage
\Metadata
\Activity
\Graph

Power BI Report

API's Overview

Scope	Resource	API
Activity	Power BI Activity Logs	Admin API - Activity Events
Power BI Metadata	Workspaces DataSets Reports Dashboards Permissions Schema & Lineage Apps	1. Admin Scan API – GetModifiedWorkspaces 2. Admin Scan API – PostWorkspaceInfo 3. Admin Scan API – GetScanStatus (loop) 4. Admin Scan API – GetScanResult Admin API - GetAppsAsAdmin
	RefreshHistory	Admin API - GetGroupsAsAdmin + Expand DataSets Dataset API - Get Refresh History
Users & Licenses	Users & Licenses	Graph API – Users
	Licenses Details	Graph API – SubscribedSKUs

Productivity

- Rebinding
- Premium Capacity Switch
- Devops

REST API - Rebind Reports

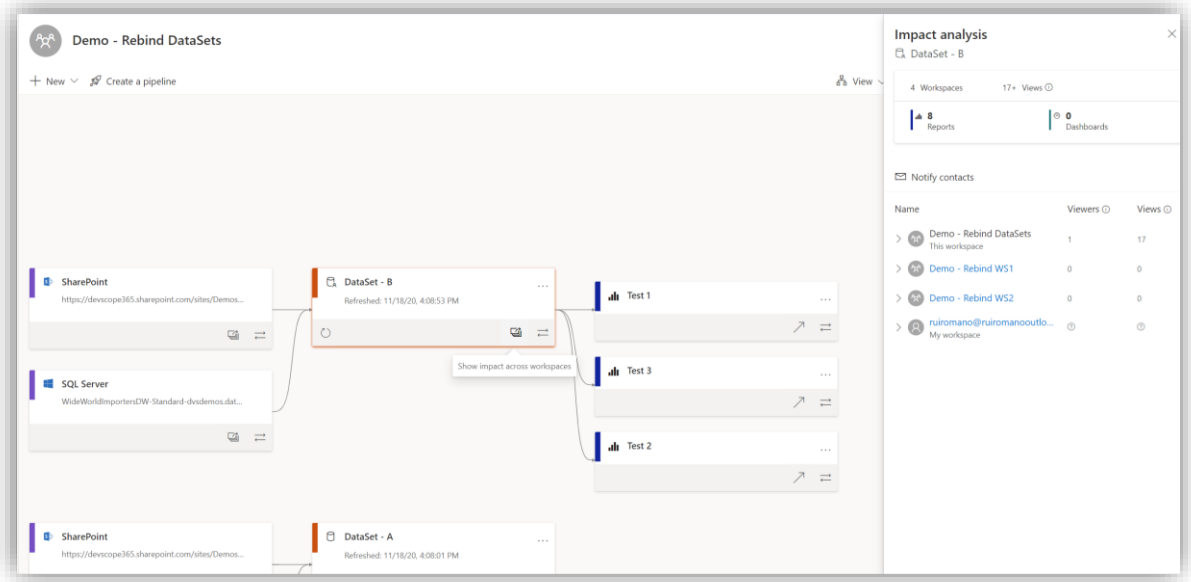
Why?

Dataset issue/corruption

Minimize user impact on a dataset change / refresh

Azure AS to Premium Migrations

…



Two Approaches:

- Manual - By specifying the reports & datasets to rebind
- Automatic - From one dataset to the other

REST API: [Rebind API]

Links: [Automatic Rebind Script]

Workspace Premium Capacity Switch

Why?

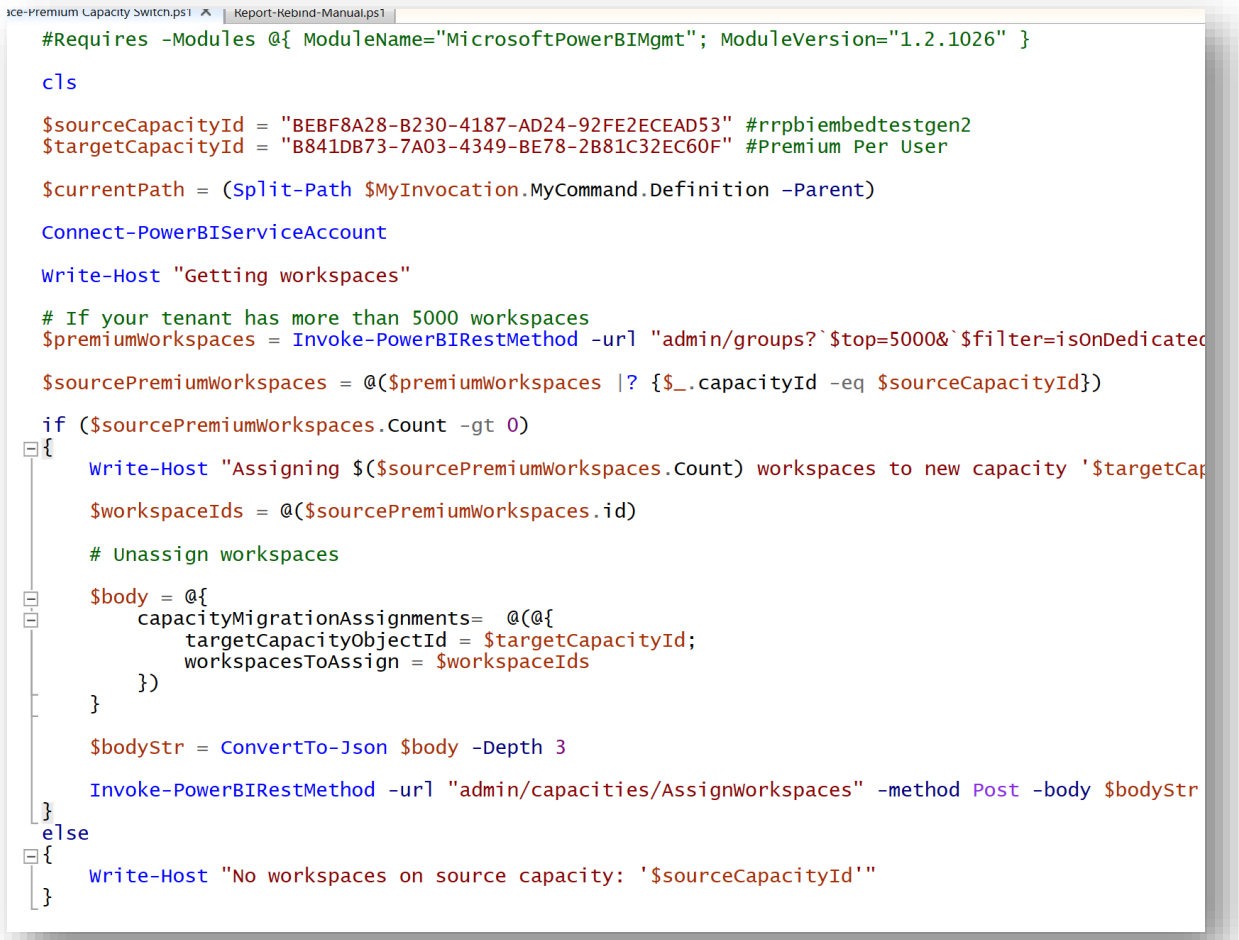
Need to reassign all workspaces to another capacity:

- Gen 1 to Gen 2 migration
- P Sku <-> A Sku <-> PPU

Please don't do it manually ☺

API's:

- [AssignWorkspacesToCapacity]




```
#Requires -Modules @{ ModuleName="MicrosoftPowerBIMgmt"; ModuleVersion="1.2.1026" }

cls

$sourceCapacityId = "BEBF8A28-B230-4187-AD24-92FE2ECEAD53" #rrpbiembedtestgen2
$targetCapacityId = "B841DB73-7A03-4349-BE78-2B81C32EC60F" #Premium Per User

$currentPath = (Split-Path $MyInvocation.MyCommand.Definition -Parent)

Connect-PowerBIServiceAccount

Write-Host "Getting workspaces"

# If your tenant has more than 5000 workspaces
$premiumWorkspaces = Invoke-PowerBIRestMethod -url "admin/groups?`$top=5000&`$filter=isOnDedicated

$sourcePremiumWorkspaces = @($premiumWorkspaces |? {$_.capacityId -eq $sourceCapacityId})

if ($sourcePremiumWorkspaces.Count -gt 0)
{
    Write-Host "Assigning $($sourcePremiumWorkspaces.Count) workspaces to new capacity '$targetCap

    $workspaceIds = @($sourcePremiumWorkspaces.id)

    # Unassign workspaces

    $body = @{
        capacityMigrationAssignments=  @(@{
            targetCapacityObjectId = $targetCapacityId;
            workspacesToAssign = $workspaceIds
        })
    }

    $bodyStr = ConvertTo-Json $body -Depth 3

    Invoke-PowerBIRestMethod -url "admin/capacities/AssignWorkspaces" -method Post -body $bodyStr
}
else
{
    Write-Host "No workspaces on source capacity: '$sourceCapacityId'"
}
```

Download: here

Power BI & DevOps

If you have Premium 💎

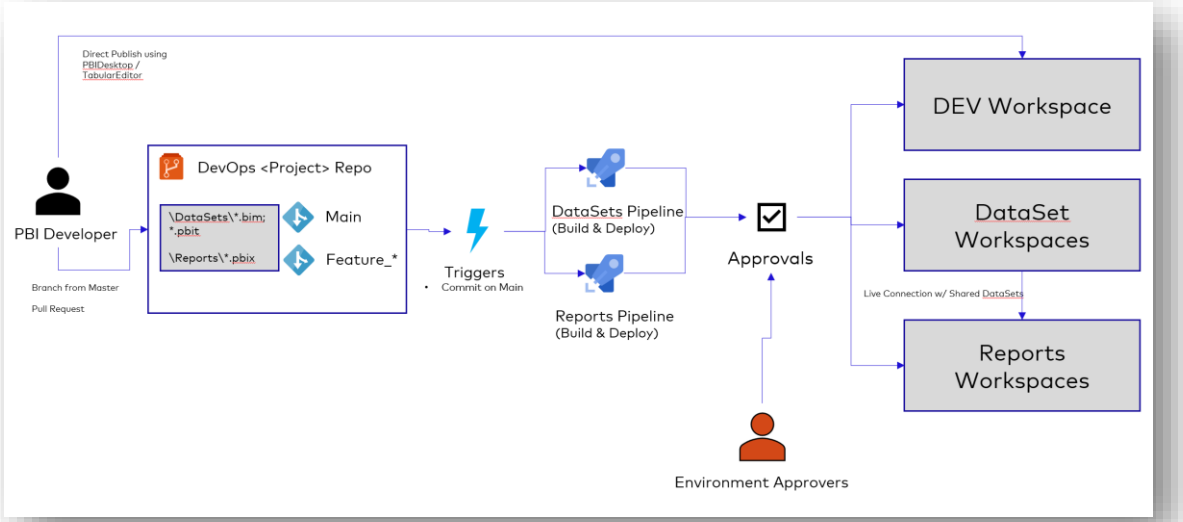
Must Watch: [Daniel Otykier Session]

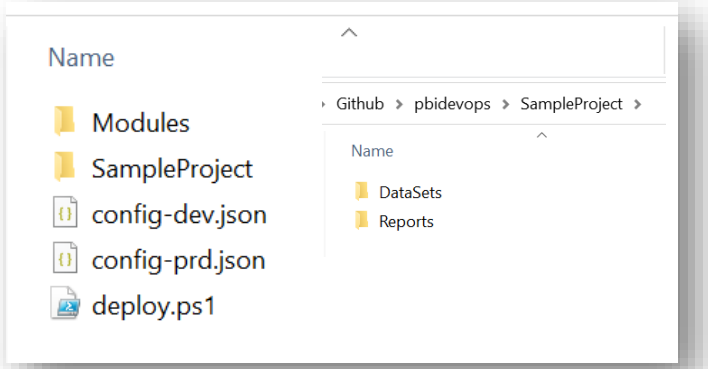
- Azure DevOps
- Tabular Editor
- REST API's

Deployment Pipelines

If you don't have Premium

REST API's & PowerShell to the rescue






```
26
27  Connect-PowerBIServiceAccount
28
29  if ($workspaces)
30  {
31      Publish-PBIWorkspaces -configPath $configPath
32  }
33
34  if ($datasets)
35  {
36      Publish-PBIDataSets -configPath $configPath -path "$path\DataSets"
37  }
38
39  if ($reports)
40  {
41      # README - The live connected PBIX reports need to be binded to an existent Datas
42      Publish-PBIReports -configPath $configPath -path "$path\Reports"
43  }
44
45  if ($paginatedReports)
46  {
47      Publish-PBIReports -configPath $configPath -path "$path\PaginatedReports"
48  }
49
```

Links: [scripts]

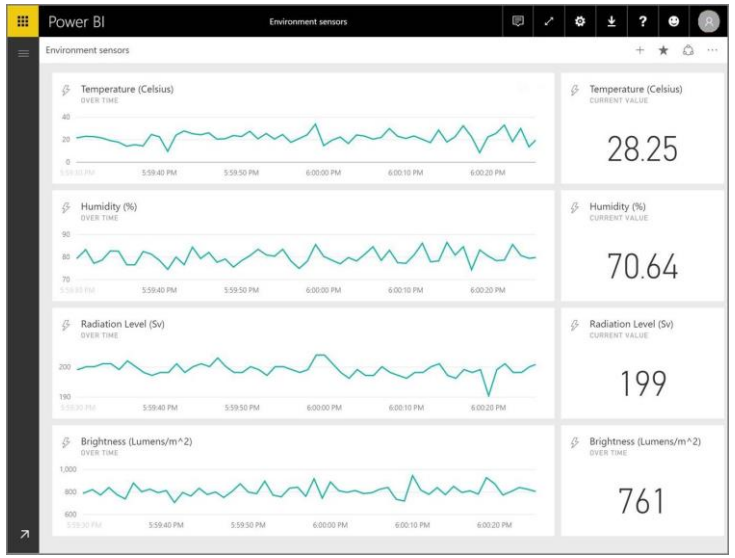
Realtime w/ REST API's

- Push Datasets
- Streaming Datasets & PowerAutomate

Push Dataset vs Streaming Dataset

Push Dataset	Streaming Dataset
• Create a complex dataset: multiple tables, measures & relationships • Automatically retains history • Build Power BI Reports directly • ~2-5s realtime • Limitations: link	• Limited to 1 table • Cannot create measures • No History, only if “Historic Analysis” is enabled • <1s realtime

Capability	Push	Streaming	PubNub
Dashboard tiles update in real-time as data is pushed in	**Yes.** For visuals built via reports and then pinned to dashboard.	**Yes.** For custom streaming tiles added directly to the dashboard.	**Yes.** For custom streaming tiles added directly to the dashboard.
Dashboard tiles update with smooth animations	**No.**	**Yes.**	**Yes.**
Data stored permanently in Power BI for historic analysis	**Yes.**	**No.** Data is temporarily stored for one hour to render visuals.	**No.**
Build Power BI Reports atop the data	**Yes.**	**No.**	**No.**
Max rate of data ingestion.	**1 request/s** **16 MB/request**	**5 request/s** **15 KB/request**	**N/A** Data is not being pushed into Power BI
Limits on data throughput	**1M rows/hour**	None.	**N/A** Data is not being pushed into Power BI



Real-time streaming in Power BI - Power BI | Microsoft Docs

Download: here

Thanks!

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