Microsoft Power BI

Power BI Dev Camp – Session 2

Writing PowerShell Scripts for Power BI

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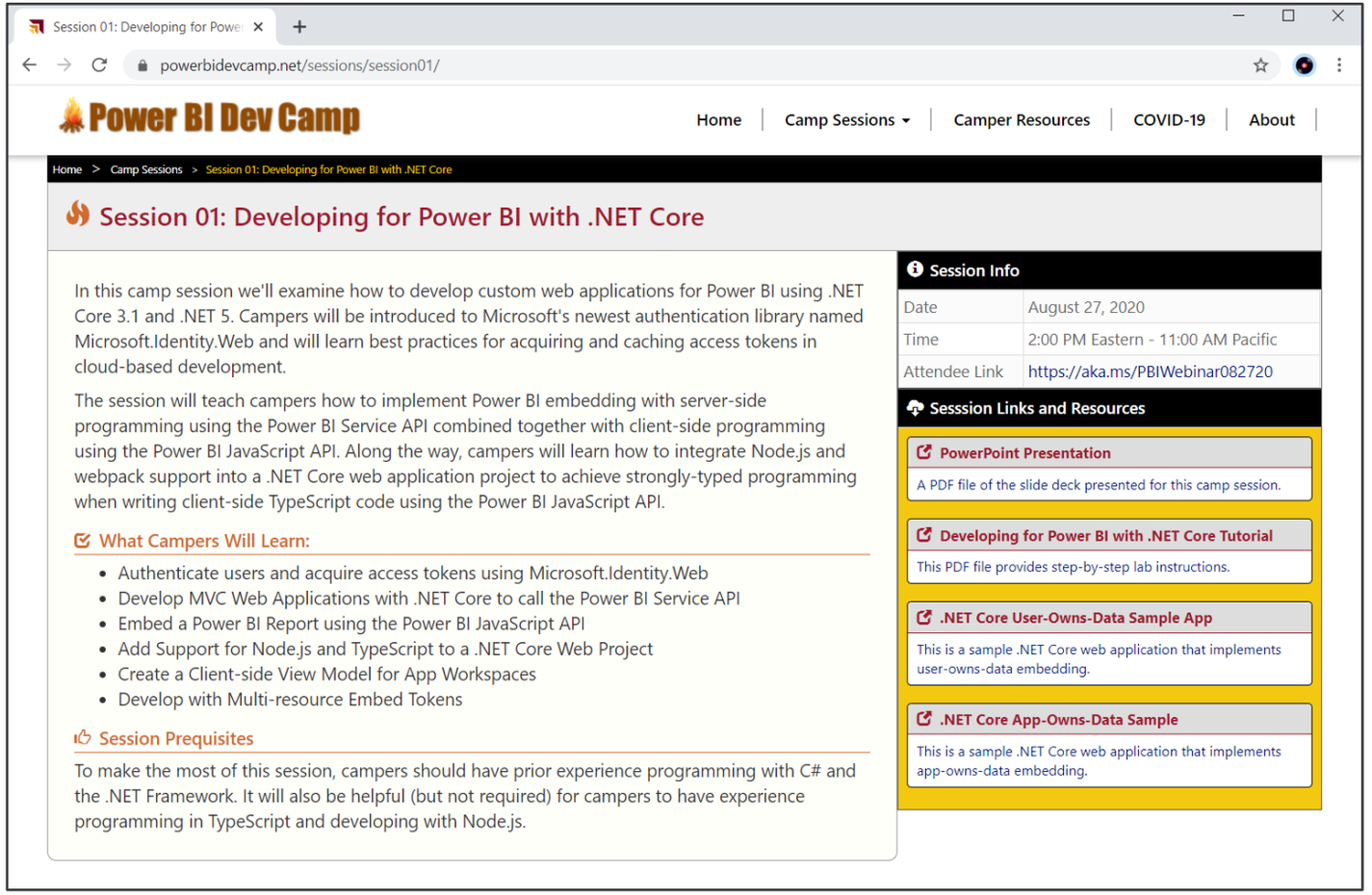
Customer Advisory Team (CAT) at Microsoft

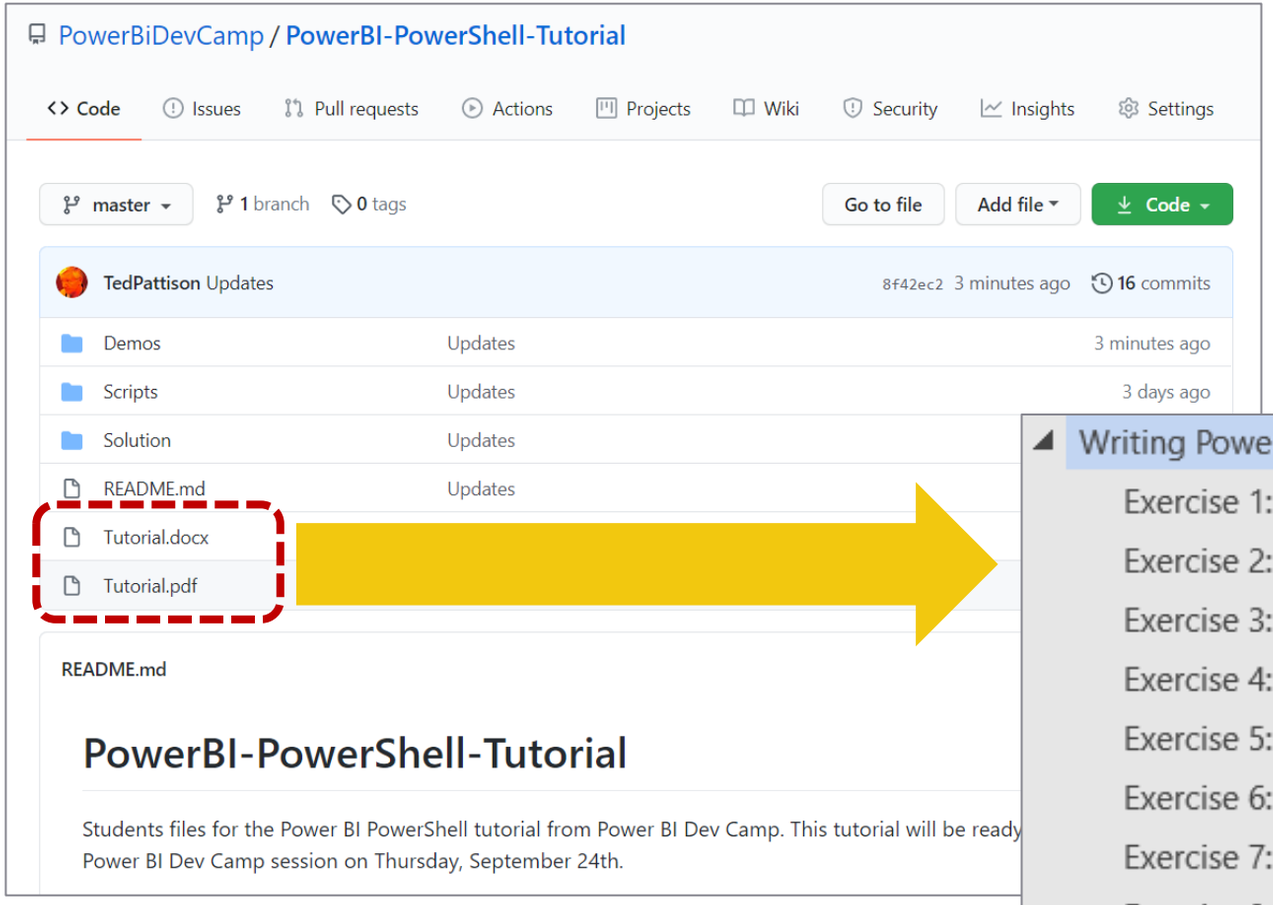
Welcome to Power BI Dev Camp

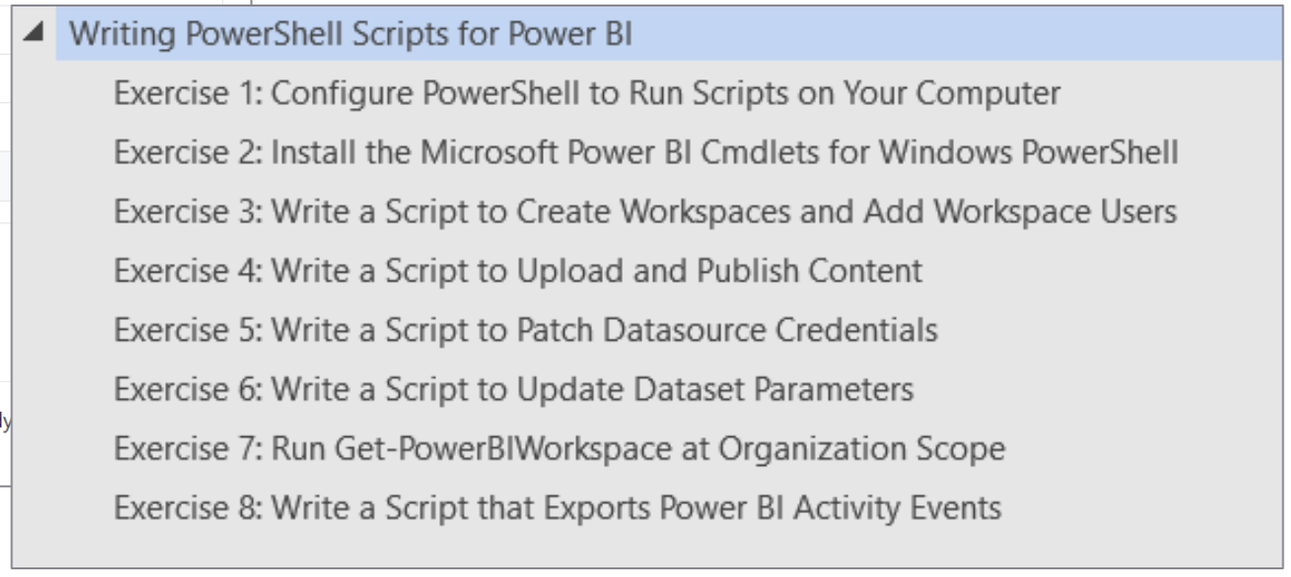
- Power BI Dev Camp Portal - https://powerbidevcamp.net



Writing PowerShell Scripts for Power BI Tutorial

- https://github.com/PowerBiDevCamp/PowerBI-PowerShell-Tutorial





Agenda

- Reviewing of PowerShell Fundamentals
- Installing The Power BI Library for PowerShell
- Creating and Managing Workspaces
- Executing Operations with Invoke-PowerBIRestMethod
- Executing Administrative Commands
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PowerShell Fundamentals

- **What is PowerShell?**
  - A task automation tool with command shell and scripting language
  - Function are called cmdlets and follow Verb-Noun naming conventions
  - Libraries are cmdlets are called modules and can be installed as needed

- **PowerShell Programming Essentials**
  - Object-based script language
  - Tab Completion
  - Pipelining

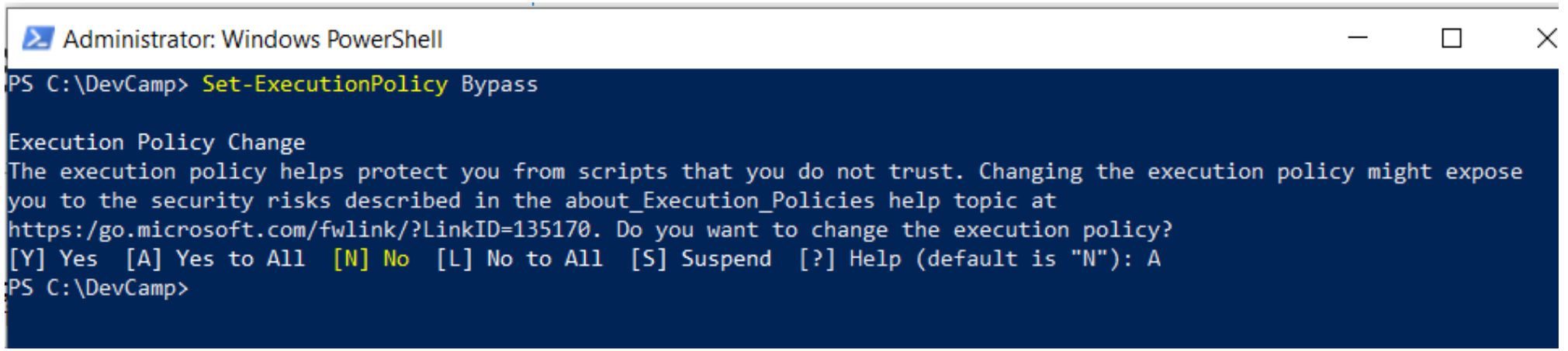
PowerShell Versions

- **PowerShell 5 (aka Windows PowerShell)**
  - Comes as part of Windows
  - Included as part of Windows Management Framework 5
  - Script authors can use PowerShell Integrated Script Environment (ISE)

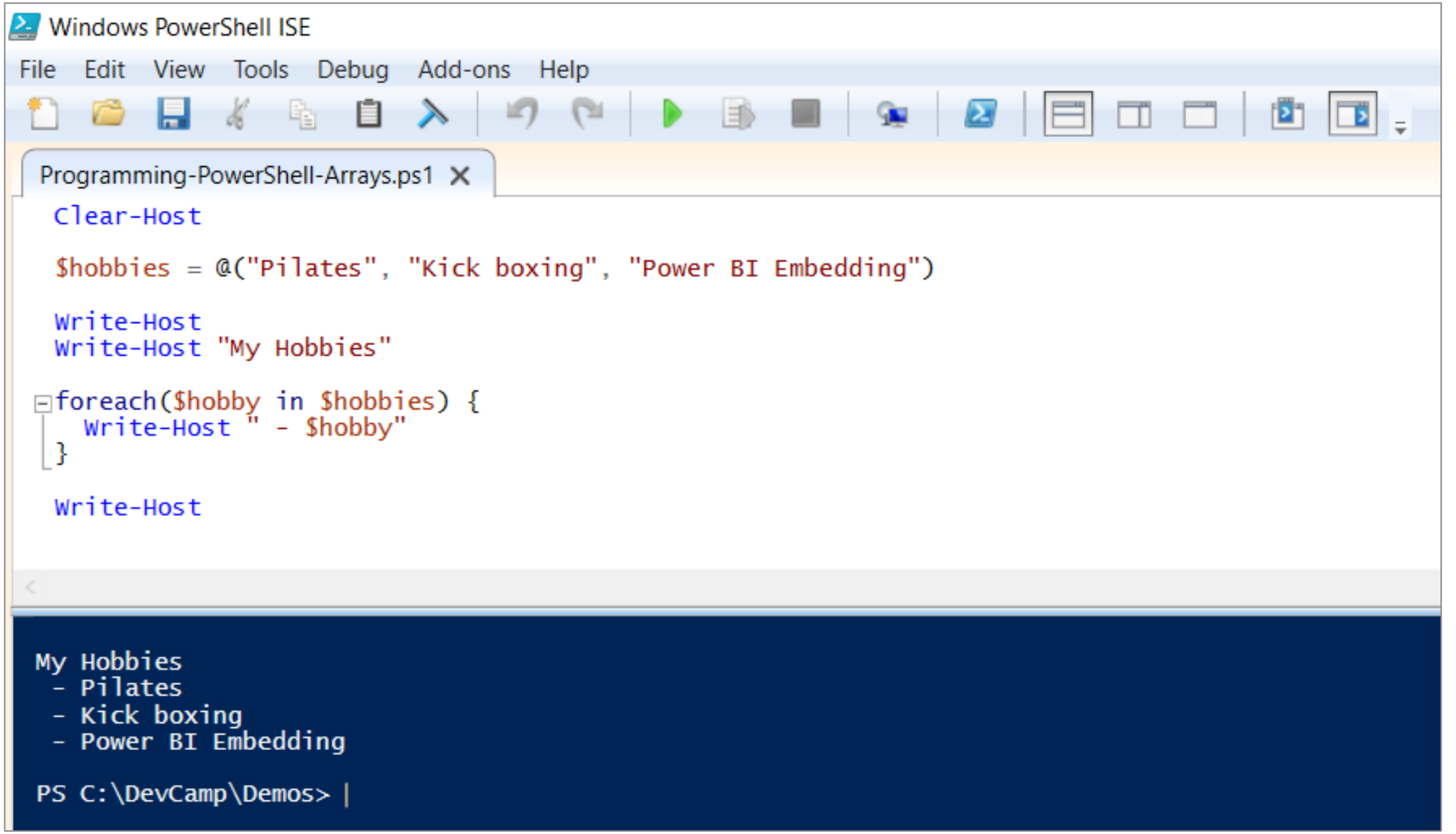
- **PowerShell 7 (aka PowerShell Core)**
  - Introduces cross-platform support for Linux and Mac
  - Not supported by familiar PowerShell Integrated Script Environment (ISE)
  - Script authors can use Visual Studio Code with PowerShell Extension

Set-ExecutionPolicy

- **PowerShell execution policy controls what scripts can run**
  - Default policy does not allow scripts to run if they are not digitally signed
  - You must call **Set-ExecutionPolicy** to allow unsigned scripts to execute



PowerShell Arrays and Enumeration



Dictionaries as Objects

Programming-PowerShell-Dictionaries.ps1

```
Clear-Host

$pets = @(
    @{ Name="Bob"; Type="Cat" }
    @{ Name="Diggity"; Type="Dog" }
    @{ Name="Larry"; Type="Lizard" }
    @{ Name="Penny"; Type="Porcupine" }
)

Write-Host
Write-Host "My Pets"

foreach($pet in $pets) {
    $name = $pet.Name
    $type = $pet.Type
    Write-Host " - $name the $type"
}

Write-Host
```

```
My Pets
 - Bob the Cat
 - Diggity the Dog
 - Larry the Lizard
 - Penny the Porcupine
```

Writing Output to a Text File

Programming-PowerShell-Text-Files.ps1

```powershell
$outputFilePath = "$PSScriptRoot/Pets.txt"

$pets = @(
    @{ Name="Bob"; Type="Cat" }
    @{ Name="Diggity"; Type="Dog" }
    @{ Name="Larry"; Type="Lizard" }
    @{ Name="Penny"; Type="Porcupine" }
)

"My Pets" | Out-File $outputFilePath

foreach($pet in $pets) {
    $name = $pet.Name
    $type = $pet.Type
    " - $name the $type" | Out-File $outputFilePath -Append
}

notepad.exe $outputFilePath
```

```
PS C:\DevCamp\Demos> C:\DevCamp\Demos\Programming-PowerShell-Tex

PS C:\DevCamp\Demos>
```

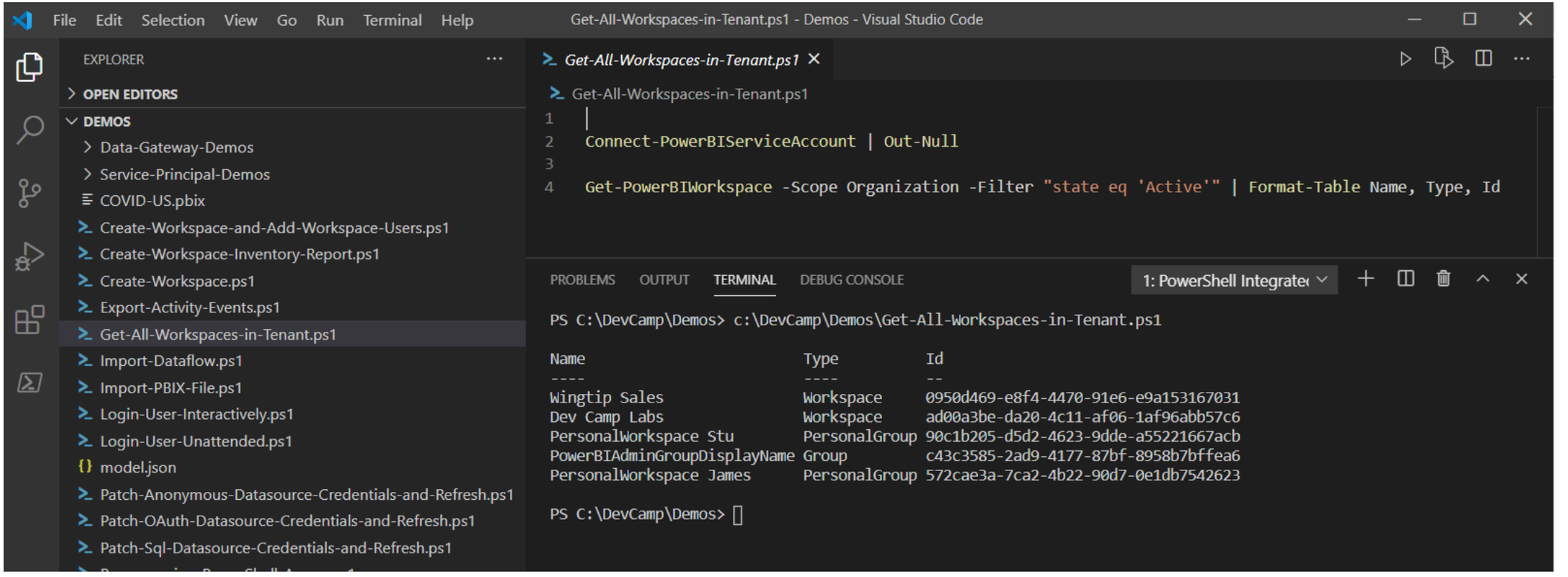
Pets.txt - Notepad

File Edit Format View Help

```
My Pets
 - Bob the Cat
 - Diggity the Dog
 - Larry the Lizard
 - Penny the Porcupine
```

Working with PowerShell 7 and Visual Studio Code

- **Visual Studio Code provides PowerShell extension**
  - Extension makes it possible to write and test code with PowerShell 7
  - Great option for developers already familiar with Visual Studio Code



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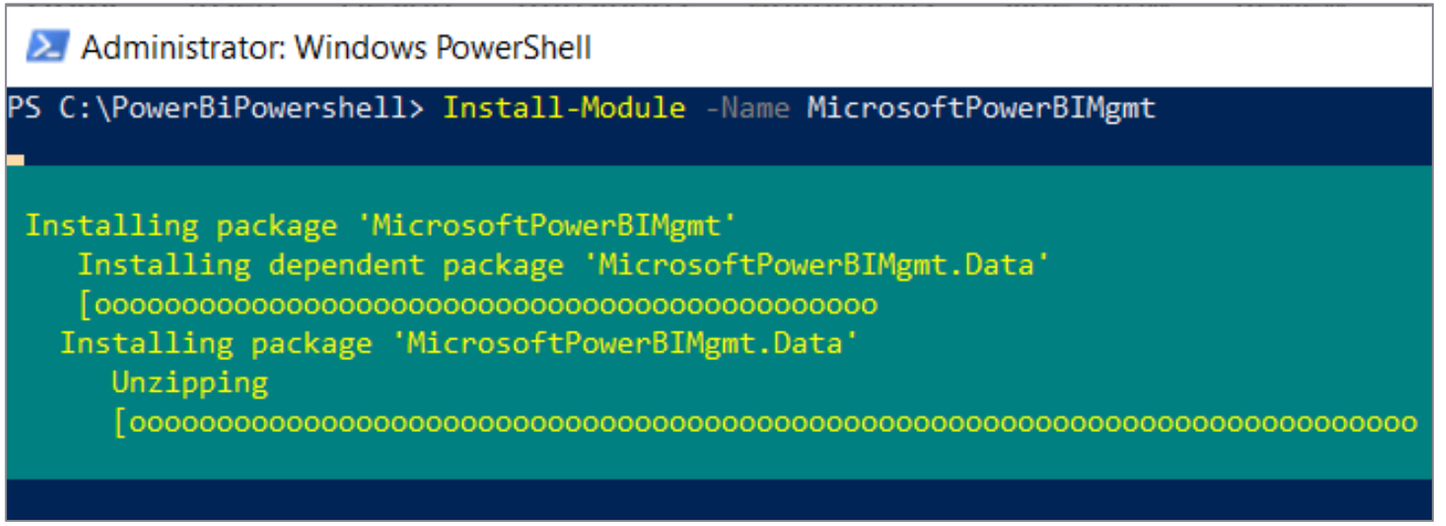
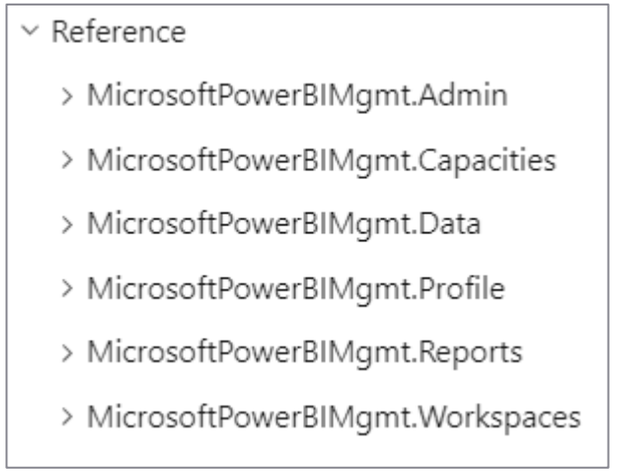
Installing Power BI Cmdlets for PowerShell

- **Must be installed locally on your computer**

  https://docs.microsoft.com/en-us/powershell/power-bi/overview

  Install-Module -Name MicrosoftPowerBIMgmt






```
PS C:\DevCamp> Get-InstalledModule MicrosoftPowerBIMgmt

Version    Name                                Repository           Description
-------    ----                                ----------           -----------
1.0.867    MicrosoftPowerBIMgmt                PSGallery            Microsoft Power BI PowerShell - All cmdlets for Microsoft Power BI
```

MicrosoftPowerBIMgmt Modules

- MicrosoftPowerBIMgmt.Profile
  - MicrosoftPowerBIMgmt.Profile
  - Connect-PowerBIServiceAccount
  - Disconnect-PowerBIServiceAccount
  - Get-PowerBIAccessToken
  - Invoke-PowerBIRestMethod
  - Resolve-PowerBIError

- MicrosoftPowerBIMgmt.Workspaces
  - MicrosoftPowerBIMgmt.Workspaces
  - Add-PowerBIWorkspaceUser
  - Get-PowerBIWorkspace
  - Get-PowerBIWorkspaceMigrationStatus
  - New-PowerBIWorkspace
  - Remove-PowerBIWorkspaceUser
  - Restore-PowerBIWorkspace
  - Set-PowerBIWorkspace

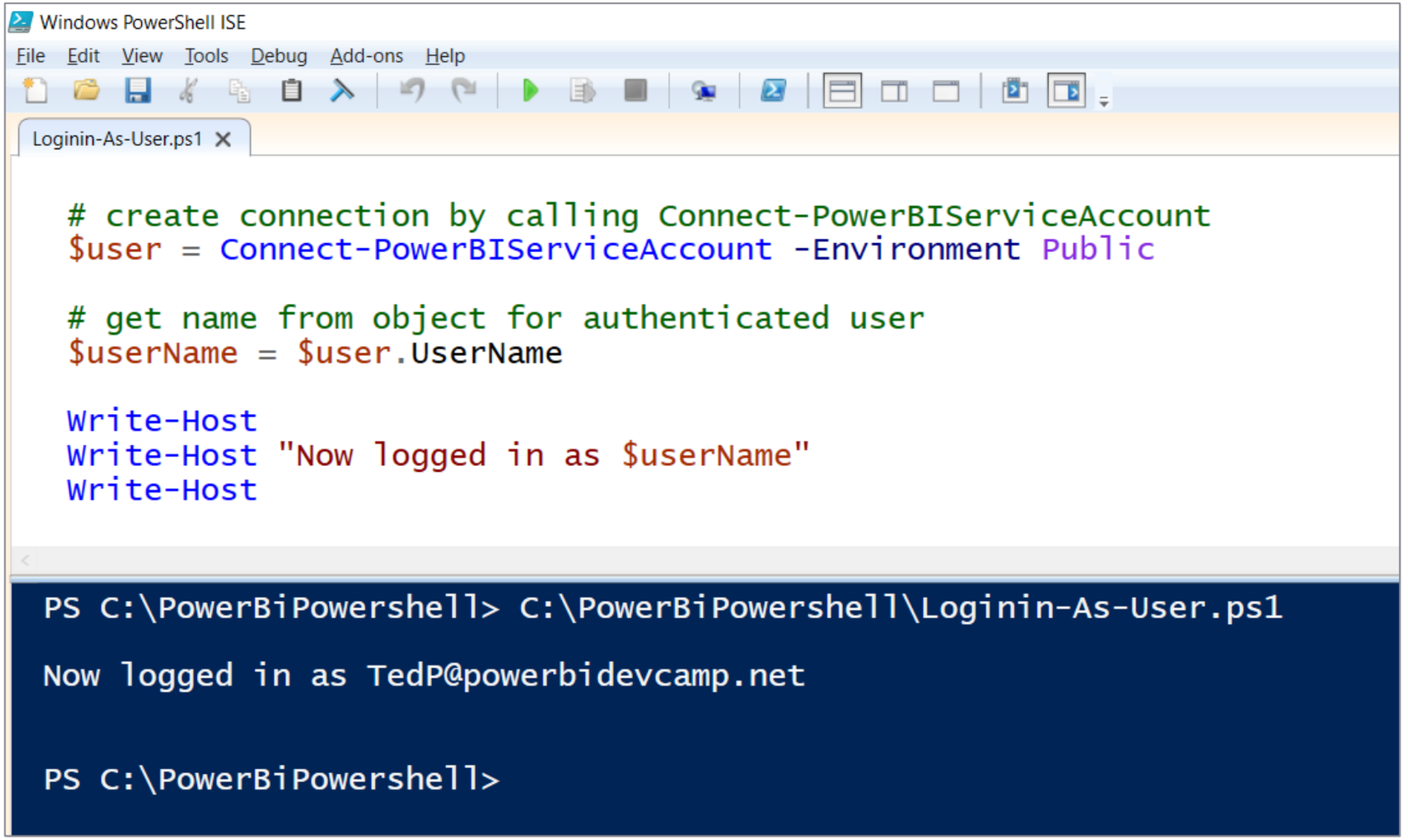
- MicrosoftPowerBIMgmt.Reports
  - MicrosoftPowerBIMgmt.Reports
  - Copy-PowerBIReport
  - Copy-PowerBITile
  - Export-PowerBIReport
  - Get-PowerBIDashboard
  - Get-PowerBIImport
  - Get-PowerBIReport
  - Get-PowerBITile
  - New-PowerBIDashboard
  - New-PowerBIReport
  - Remove-PowerBIReport

- MicrosoftPowerBIMgmt.Data
  - MicrosoftPowerBIMgmt.Data
  - Add-PowerBIDataset
  - Add-PowerBIRow
  - Export-PowerBIDataflow
  - Get-PowerBIDataflow
  - Get-PowerBIDataflowDatasource
  - Get-PowerBIDataset
  - Get-PowerBIDatasource
  - Get-PowerBITable
  - New-PowerBIColumn
  - New-PowerBIDataset
  - New-PowerBITable
  - Remove-PowerBIRow
  - Set-PowerBIDataset
  - Set-PowerBITable

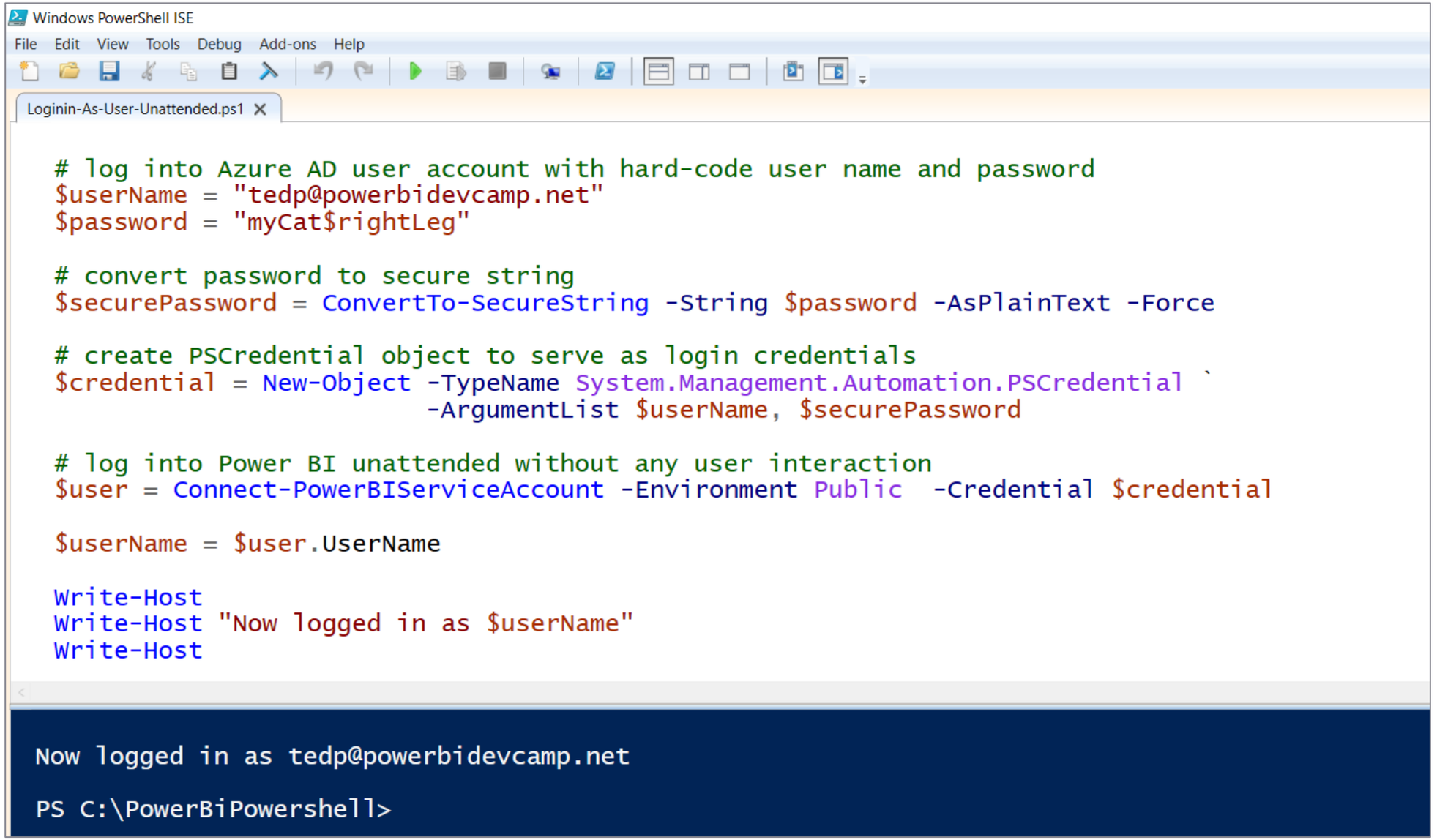
- MicrosoftPowerBIMgmt.Admin
  - MicrosoftPowerBIMgmt.Admin
  - Add-PowerBIEncryptionKey
  - Get-PowerBIActivityEvent
  - Get-PowerBIEncryptionKey
  - Get-PowerBIWorkspaceEncryptionStatus
  - Set-PowerBICapacityEncryptionKey
  - Switch-PowerBIEncryptionKey

- MicrosoftPowerBIMgmt.Capacities
  - MicrosoftPowerBIMgmt.Capacities
  - Get-PowerBICapacity

Calling Connect-PowerBiServiceAccount



Writing Scripts with Unattended User Login



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Create Workspace

Create-Workspace.ps1

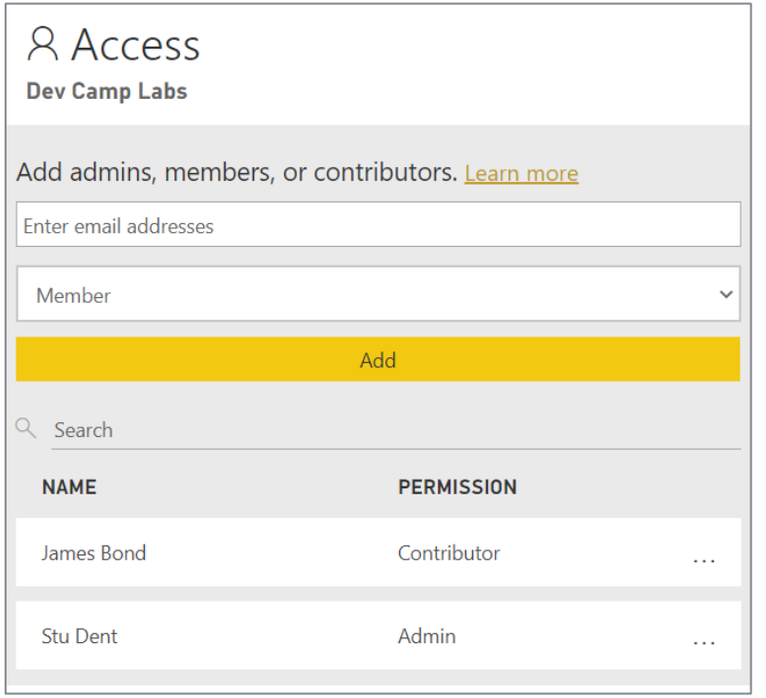
```powershell
Write-Host

Connect-PowerBIServiceAccount | Out-Null

$workspaceName = "Dev Camp Demos"

$workspace = New-PowerBIGroup -Name $workspaceName

$workspace | select *
```

```
PS C:\DevCamp\Demos> C:\DevCamp\Demos\Create-Workspace.ps1



Id                    : 22f36d1c-05cd-4644-8dfc-da19f77f4725
Name                  : Dev Camp Demos
IsReadOnly            : False
IsOnDedicatedCapacity : False
CapacityId            :
Description           :
Type                  :
State                 :
IsOrphaned            : False
Users                 :
Reports               :
Dashboards            :
Datasets              :
Dataflows             :
Workbooks             :
```

Add Workspace Users

Create-Workspace-and-Add-Workspace-Users.ps1

```powershell
Write-Host

Connect-PowerBIServiceAccount | Out-Null

$workspaceName = "Dev Camp Demos"

$workspace = Get-PowerBIWorkspace -Name $workspaceName

if($workspace) {
  Write-Host "The workspace named $workspaceName already exists"
}
else {
  Write-Host "Creating new workspace named $workspaceName"
  $workspace = New-PowerBIGroup -Name $workspaceName
}

# add user as workspace member
$userEmail = "JamesB@pbidev0924.onMicrosoft.com"

Add-PowerBIWorkspaceUser -Id $workspace.Id -UserEmailAddress $userEmail -AccessRight Contributor
```

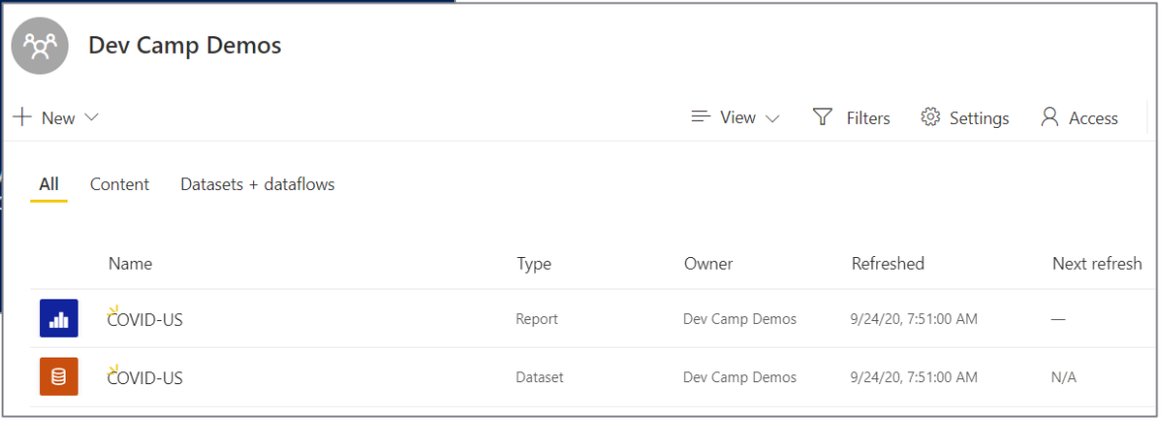


Import PBIX File

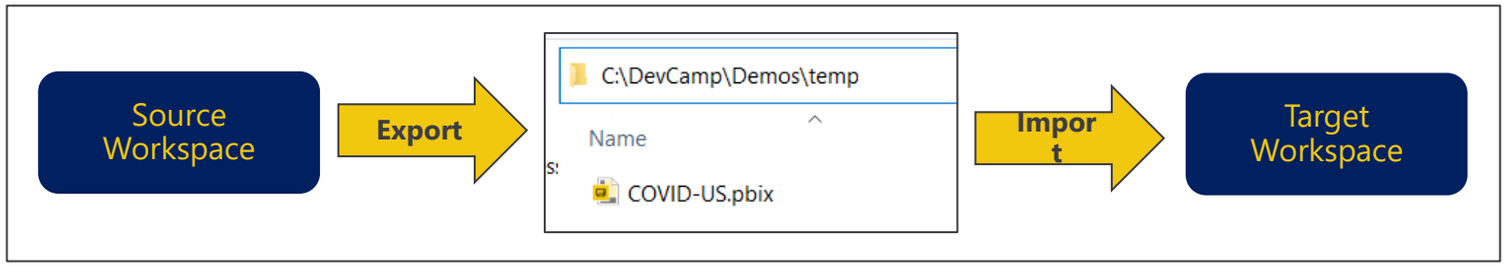
Import-PBIX-File.ps1

```powershell
Write-Host

Connect-PowerBIServiceAccount | Out-Null

$workspaceName = "Dev Camp Demos"

$workspace = Get-PowerBIWorkspace -Name $workspaceName

if($workspace) {
  Write-Host "The workspace named $workspaceName already exists"
}
else {
  Write-Host "Creating new workspace named $workspaceName"
  $workspace = New-PowerBIGroup -Name $workspaceName
}

$pbixFilePath = "$PSScriptRoot\COVID-US.pbix"

$import = New-PowerBIReport -Path $pbixFilePath -Workspace $workspace -ConflictAction CreateOrOverwrite

$import | select *
```

```
PS C:\DevCamp\Demos> C:\DevCamp\Demos\Import-PBIX-File.ps1

The workspace named Dev Camp Demos already exists


Id        : cae0f604-6a42-49b3-98cb-a8e1cf072f5e
Name      : COVID-US
WebUrl    : https://app.powerbi.com/groups/22f36d1c-05cd-4644-8dfc-da19f77f4725/
EmbedUrl  : https://app.powerbi.com/reportEmbed?reportId=cae0f604-6a42-49b3-98cb
            Rvd3MubmV0IiwiZW1iZWRGZWF0dXJlcyI6eyJtb2Rlcm5FbWJlZCI6dHJ1ZX19
DatasetId :
```



Copy Report to New Workspace



Copy-Report-to-New-Workspace.ps1

```powershell
Write-Host

Connect-PowerBIServiceAccount | Out-Null

$sourceWorkspaceName = "Dev Camp Labs"
$reportName = "COVID-US"

$targetWorkspaceName = "Dev Camp Demos"

$sourceWorkspace = Get-PowerBIWorkspace -Name $sourceWorkspaceName
$targetWorkspace = Get-PowerBIWorkspace -Name $targetWorkspaceName

Write-Host "Getting metadata for report $reportName..."
$report = Get-PowerBIReport -WorkspaceId $sourceWorkspace.Id -Name $reportName
$reportId = $report.Id

Write-Host "Exporting report from source workspace to temp PBIX file..."
New-Item -ItemType Directory -Force -Path "$PSScriptRoot/temp" | Out-Null
$reportTempFilePath = "$PSScriptRoot/temp/$reportName.pbix"
Export-PowerBIReport -WorkspaceId $sourceWorkspace.Id -Id $reportId -OutFile $reportTempFilePath

Write-Host "Importing report from PBIX file into target workspace..."
New-PowerBIReport -Path $reportTempFilePath -WorkspaceId $targetWorkspace.Id -Name $reportName -ConflictAction CreateOrOverwrite

Write-Host "Deleting temp file...."
Remove-Item -Path $reportTempFilePath
```

Calling Get-PowerBIDataset

Exercise05.ps1

```
Connect-PowerBIServiceAccount | Out-Null

$workspaceName = "Dev Camp Labs"
$datasetName = "COVID-US"

$workspace = Get-PowerBIWorkspace -Name $newWorkspaceName

$dataset = Get-PowerBIDataset -WorkspaceId $workspace.Id | Where-Object Name -eq $datasetName

$workspaceId = $workspace.Id
$datasetId = $dataset.Id

Write-Host
Write-Host "The ID for $workspaceName is $workspaceId"
Write-Host "The ID for $datasetName is $datasetId"
```

```
PS C:\DevCamp\Scripts> C:\DevCamp\Scripts\Exercise05.ps1


The ID for Dev Camp Labs is ad00a3be-da20-4c11-af06-1af96abb57c6
The ID for COVID-US is 456bfe55-ae87-4911-9e0a-c6071ffa27d3

PS C:\DevCamp\Scripts>
```

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Calling Invoke-PowerBIRestMethod

- **Many Power BI API operations not exposed directly through cmdlets**
  - **Invoke-PowerBIRestMethod** makes it possible to call many API operations
  - Requires that you parse together REST URL for Power BI Service API
  - Sometimes requires you to construct JSON payload for HTTP request body
  - Sometimes requires you to parse JSON returned from API call

Delete-Dataset.ps1

```
Connect-PowerBIServiceAccount | Out-Null

$workspaceName = "Dev Camp Demos"
$datasetName = "COVID-US"

# get object for target workspace
$workspace = Get-PowerBIWorkspace -Name $workspaceName

# get object for new dataset
$dataset = Get-PowerBIDataset -WorkspaceId $workspace.Id | Where-Object Name -eq $datasetName

# determine workspace Id and Dataset Id
$workspaceId = $workspace.Id
$datasetId = $dataset.Id

# parse REST Url for Power BI Service to delete dataset
$restUrl = "groups/$workspaceId/datasets/$datasetId"

# execute HTTP DELETE operation to delete dataset
Invoke-PowerBIRestMethod -Method Delete -Url $restUrl
```

Update Credentials for Anonymous Access

```powershell
$datasources = Get-PowerBIDatasource -WorkspaceId $workspaceId -DatasetId $datasetId

foreach($datasource in $datasources) {

  # parse together REST URL to reference datasource to be patched
  $gatewayId = $datasource.gatewayId
  $datasourceId = $datasource.datasourceId
  $datasourcePatchUrl = "gateways/$gatewayId/datasources/$datasourceId"

  Write-Host "Patching credentials for $datasourceId"

  # create HTTP request body to patch datasource credentials
  $patchBody = @{
    "credentialDetails" = @{
      "credentials" = "{""credentialData"":""""}"
      "credentialType" = "Anonymous"
      "encryptedConnection" =  "NotEncrypted"
      "encryptionAlgorithm" = "None"
      "privacyLevel" = "Public"
    }
  }

  # convert body contents to JSON
  $patchBodyJson = ConvertTo-Json -InputObject $patchBody -Depth 6 -Compress

  # execute PATCH operation to set datasource credentials
  Invoke-PowerBIRestMethod -Method Patch -Url $datasourcePatchUrl -Body $patchBodyJson
}
```

This is what is sent over network

```json
{
  "credentialDetails": {
    "encryptedConnection": "NotEncrypted",
    "credentialType": "Anonymous",
    "credentials": "{\"credentialData\":\"\"}",
    "privacyLevel": "Public",
    "encryptionAlgorithm": "None"
  }
}
```

Starting a Refresh Operation

```
# parse REST URL for dataset refresh
$datasetRefreshUrl = "groups/$workspaceId/datasets/$datasetId/refreshes"

Write-Host "Starting refresh operation"

# execute POST to begin dataset refresh
Invoke-PowerBIRestMethod -Method Post -Url $datasetRefreshUrl -WarningAction Ignore
```

Update Credentials for Azure SQL Server Database

```powershell
$datasources = Get-PowerBIDatasource -WorkspaceId $workspaceId -DatasetId $datasetId

foreach($datasource in $datasources) {

  $gatewayId = $datasource.gatewayId
  $datasourceId = $datasource.datasourceId
  $datasourcePatchUrl = "gateways/$gatewayId/datasources/$datasourceId"

  Write-Host "Patching credentials for $datasourceId"

  # add credentials for SQL datasource
  $sqlUserName = "CptStudent"
  $sqlUserPassword = "pass@word1"

  # create HTTP request body to patch datasource credentials
  $userNameJson = "{""name"":""username"",""value"":""$sqlUserName""}"
  $passwordJson = "{""name"":""password"",""value"":""$sqlUserPassword""}"

  $patchBody = @{
    "credentialDetails" = @{
      "credentials" = "{""credentialData"":[ $userNameJson, $passwordJson ]}"
      "credentialType" = "Basic"
      "encryptedConnection" =  "NotEncrypted"
      "encryptionAlgorithm" = "None"
      "privacyLevel" = "Organizational"
    }
  }

  # convert body contents to JSON
  $patchBodyJson = ConvertTo-Json -InputObject $patchBody -Depth 6 -Compress

  # execute PATCH operation to set datasource credentials
  Invoke-PowerBIRestMethod -Method Patch -Url $datasourcePatchUrl -Body $patchBodyJson
}
```

This is what is sent over network

```json
{
  "credentialDetails": {
    "encryptedConnection": "NotEncrypted",
    "credentialType": "Basic",
    "credentials": "{\"credentialData\":[ {\"name\":\"username\",\"value\":\"CptStudent\"}, {\"name\":\"password\",\"value\":\"pass@word1\"} ]}",
    "privacyLevel": "Organizational",
    "encryptionAlgorithm": "None"
  }
}
```

Import Dataflow

Import-Dataflow.ps1

```powershell
Connect-PowerBIServiceAccount | Out-Null

# modify name of target workspace if needed
$workspaceName = "Dev Camp Labs"

# modify name and path of model.json file if needed
$DataflowImportFileName = "$PSScriptRoot\model.json"

# read JSON from model.json into locale variable
$DataflowDefinition = [IO.File]::ReadAllText($DataflowImportFileName)

Connect-PowerBIServiceAccount
$UserAccessToken = Get-PowerBIAccessToken
$bearer = $UserAccessToken.Authorization.ToString()

# get workspace ID from workspace name
$workspace = Get-PowerBIWorkspace -Name $workspaceName
$workspaceId = $workspace.Id

# construct URL to import model.json - Note datasetDisplayName must be hard-coded to "model.json"
$importsUrl = "https://api.powerbi.com/v1.0/myorg/groups/$workspaceId/imports?datasetDisplayName=model.json"

$boundary = [System.Guid]::NewGuid().ToString("N")
$LF = [System.Environment]::NewLine

$contentType = "multipart/form-data; boundary=""$boundary"""

$body = (
 "--$boundary",
 "Content-Disposition: form-data $LF",
 $DataflowDefinition,
 "--$boundary--$LF"
) -join $LF

$headers = @{
  'Authorization' = "$bearer"
  'Content-Type' = "$contentType"
}

Invoke-RestMethod -Uri $importsUrl -ContentType $contentType -Method POST -Headers $headers -Body $body
```

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Individual Scope versus Organizational Scope

- **Scope can be set to Individual or Organization**
  - Individual scope operates against only workspaces assigned to the caller
  - Organization scope operates against all workspaces within a tenant
  - Organization scope makes it possible to discover workspaces resources

- Organization scope requires Power BI admin privileges
  - User must be Power BI Service admin or global tenant admin

```
Get-PowerBIWorkspace -Scope Organization
```

Get All Workspaces in Tenant

Get-All-Workspaces-in-Tenant.ps1

```
Connect-PowerBIServiceAccount | Out-Null

Get-PowerBIWorkspace -Scope Organization -Filter "state eq 'Active'" | Format-Table Name, Type, Id
```

```
PS C:\DevCamp\Demos> C:\DevCamp\Demos\Get-All-Workspaces-in-Tenant.ps1

Name                          Type          Id
----                          ----          --
Wingtip Sales                 Workspace     0950d469-e8f4-4470-91e6-e9a153167031
Dev Camp Labs                 Workspace     ad00a3be-da20-4c11-af06-1af96abb57c6
Dev Camp Demos                Workspace     22f36d1c-05cd-4644-8dfc-da19f77f4725
PersonalWorkspace Stu         PersonalGroup 90c1b205-d5d2-4623-9dde-a55221667acb
PowerBIAdminGroupDisplayName  Group         c43c3585-2ad9-4177-87bf-8958b7bffea6
PersonalWorkspace James       PersonalGroup 572cae3a-7ca2-4b22-90d7-0e1db7542623
```

Create Workspace Inventory Report

Create-Workspace-Inventory-Report.ps1

```powershell
Write-Host

Connect-PowerBIServiceAccount | Out-Null

$workspaceName = "Dev Camp Labs"

$workspace = Get-PowerBIWorkspace -Name $workspaceName -Scope Organization -Include All
$workspaceId = $workspace.Id

$outputFile = "$PSScriptRoot/WorkspaceReport.txt"
"Inventory Report for $workspaceName ($workspaceId)" | Out-File $outputFile

"`n- Users:" | Out-File $outputFile -Append
foreach($user in $workspace.Users){
  $userId = $user.Identifier
  $userAccessRight = $user.AccessRight
  "   - $userId ($userAccessRight)" | Out-File $outputFile -Append
}

"`n- Datasets:" | Out-File $outputFile -Append
foreach($dataset in $workspace.Datasets){
  $dataset | select *
  $datasetName = $dataset.Name
  $datasetId = $dataset.Id
  $ConfiguredBy = $dataset.ConfiguredBy
  $ContentProviderType = $dataset.ContentProviderType
  "    - $datasetName ($datasetId) - $ContentProviderType - Configured by $ConfiguredBy " | Out-File $outputFile -Append
}

"`n- Reports:" | Out-File $outputFile -Append
foreach($report in $workspace.Reports){
  $reportName = $report.Name
  $reportId = $report.Id
  $datasetId = $report.DatasetId
  "    - $reportName (ReportId:$reportId - DatasetId:$datasetId) " | Out-File $outputFile -Append
}

notepad.exe $outputFile
```

Create Workspace Inventory Report

Create-Workspace-Inventory-Report.ps1

```powershell
Write-Host

Connect-PowerBIServiceAccount | Out-Null

$workspaceName = "Dev Camp Labs"

$workspace = Get-PowerBIWorkspace -Name $workspaceName -Scope Organization -Include All
$workspaceId = $workspace.Id

$outputFile = "$PSScriptRoot/WorkspaceReport.txt"
"Inventory Report for $workspaceName ($workspaceId)" | Out-File $outputFile

"`n- Users:" | Out-File $outputFile -Append
foreach($user in $workspace.Users){
    $userId = $user.Identifier
    $userAccessRight = $user.AccessRight
    "   - $userId ($userAccessRigh
}

"`n- Datasets:" | Out-File $out
foreach($dataset in $workspace.
    $dataset | select *
    $datasetName = $dataset.Name
    $datasetId = $dataset.Id
    $ConfiguredBy = $dataset.Conf
    $ContentProviderType = $datas
    "    - $datasetName ($datasetI
}

"`n- Reports:" | Out-File $outp
foreach($report in $workspace.R
    $reportName = $report.Name
    $reportId = $report.Id
    $datasetId = $report.DatasetI
    "    - $reportName (ReportId:$
}

notepad.exe $outputFile
```

WorkspaceReport.txt - Notepad

File Edit Format View Help

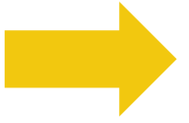
```
Inventory Report for Dev Camp Labs (ad00a3be-da20-4c11-af06-1af96abb57c6)

- Users:
   - student@pbidev0924.onmicrosoft.com (Admin)
   - JamesB@pbidev0924.onmicrosoft.com (Contributor)

- Datasets:
    - COVID-US (456bfe55-ae87-4911-9e0a-c6071ffa27d3) - PbixInImportMode - Configured by student@pbidev0924.onmicrosoft
    - Sales Report for California (9df1c53b-87f1-4c64-9ab3-c12049fd10bb) - PbixInImportMode - Configured by student@pbi
    - Sales Report for Florida (bcdea824-ebe2-4a04-856d-8b3948d4686c) - PbixInImportMode - Configured by student@pbidev
    - Sales Report for Texas (176a6305-791c-4729-af89-4ad731a30107) - PbixInImportMode - Configured by student@pbidev09

- Reports:
    - COVID-US (ReportId:73acfb75-013f-42e6-b90d-fe13f27188bc - DatasetId:456bfe55-ae87-4911-9e0a-c6071ffa27d3)
    - Sales Report for California (ReportId:6d5aee44-4933-4f55-8f39-28f13da0e56f - DatasetId:9df1c53b-87f1-4c64-9ab3-c1
    - Sales Report for Florida (ReportId:675897c5-5057-479e-b112-d1df60013c8e - DatasetId:bcdea824-ebe2-4a04-856d-8b394
    - Sales Report for Texas (ReportId:b24f875d-8e13-4887-a535-b26fbda10bb3 - DatasetId:176a6305-791c-4729-af89-4ad731a
```

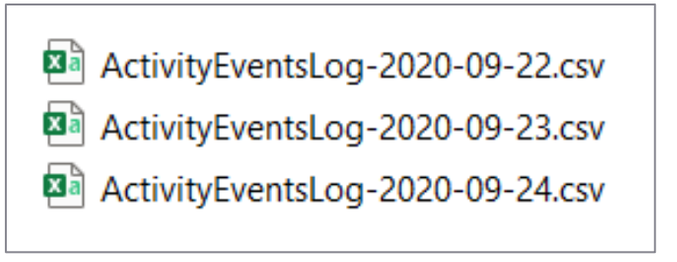
Export Power BI Activity Events

Export-Activity-Events.ps1

```powershell
function ExportDailyActivity($date) {

    $start = (Get-Date -Date ($date) -Format yyyy-MM-ddTHH:mm:ss)
    $end = (Get-Date -Date ((($date).AddDays(1)).AddSeconds(-1)) -Format yyyy-MM-ddTHH:mm:ss)

    New-Item -ItemType Directory -Force -Path "$PSScriptRoot/logs" | Out-Null

    $dateString = (Get-Date -Date ($date) -Format yyyy-MM-dd)
    $outputFile = "$PSScriptRoot/logs/ActivityEventsLog-$dateString.csv"

    Write-Host "Getting actvities for $dateString"
    $events = Get-PowerBIActivityEvent -StartDateTime $start -EndDateTime $end `
                                       -ResultType JsonString | ConvertFrom-Json

    if($events){
      Write-Host " - Exporting events to $outputFile"
      $events | Export-Csv -Path $outputFile -NoTypeInformation
    }
    else {
      Write-Host " - There was no activity on $dateString"
    }
}

$DaysBack = 3
$DateRange = $DaysBack..0

foreach($dayOffset in $DateRange) {
    $day = (((Get-Date).Date).AddDays(-$dayOffset))
    ExportDailyActivity $day
}
```

```
Getting actvities for 2020-09-21
 - There was no activity on 2020-09-21
Getting actvities for 2020-09-22
 - Exporting events to C:\DevCamp\Demos/logs/ActivityEventsLog-2020-09-22.csv
Getting actvities for 2020-09-23
 - Exporting events to C:\DevCamp\Demos/logs/ActivityEventsLog-2020-09-23.csv
Getting actvities for 2020-09-24
 - Exporting events to C:\DevCamp\Demos/logs/ActivityEventsLog-2020-09-24.csv
```





Agenda

- ✓ Reviewing of PowerShell Fundamentals
- ✓ Installing The Power BI Library for PowerShell
- ✓ Creating and Managing Workspaces
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- ✓ Executing Administrative Commands
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- ▪ Using the DataGateway PowerShell Module

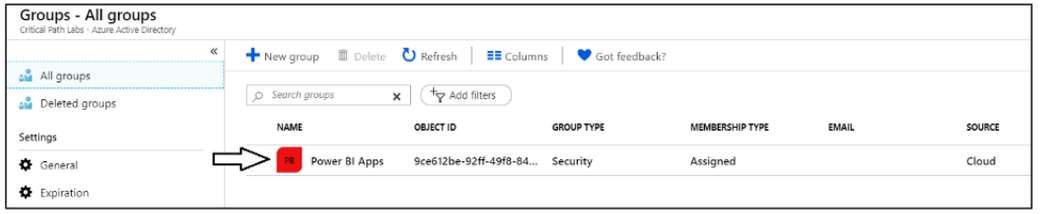
Connecting to Power BI using a Service Principal

- **You can program MicrosoftPowerBIMgmt as Service Principal**
  - Unlike user-based access, this requires creating an Azure AD application
  - You must also enable tenant-level setting for Service Principal access to API

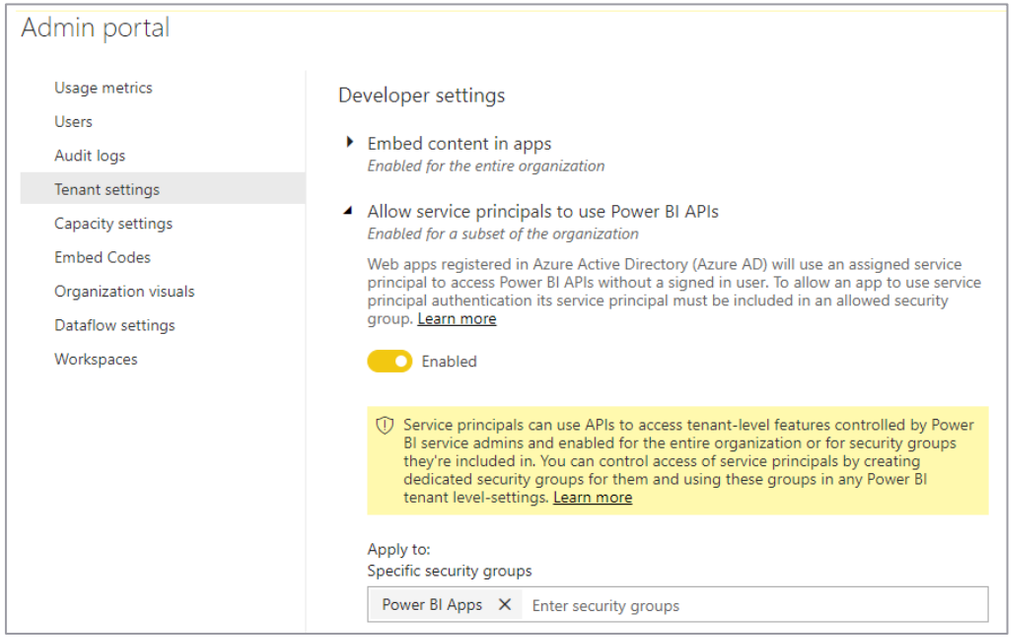
- **Service Principal Limitation**
  - Service principal cannot execute Admin API operations
  - Service principal can only view/access workspaces in which it’s a member

Setting Up for Service Principal Access – Part 1

- **Enable Service Principal Access to Power BI Service API**
  - Create an Azure AD security group (e.g. Power BI Apps)

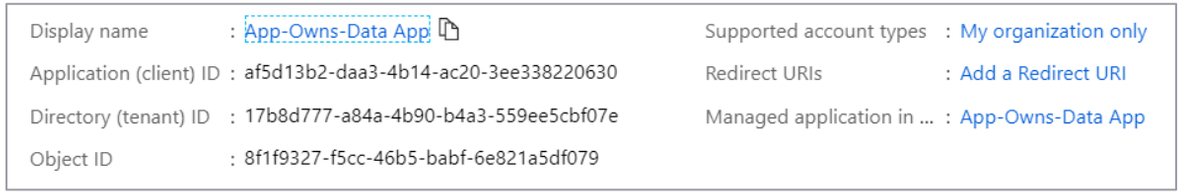


  - Add group to Power BI Allow service principals to use Power BI APIs

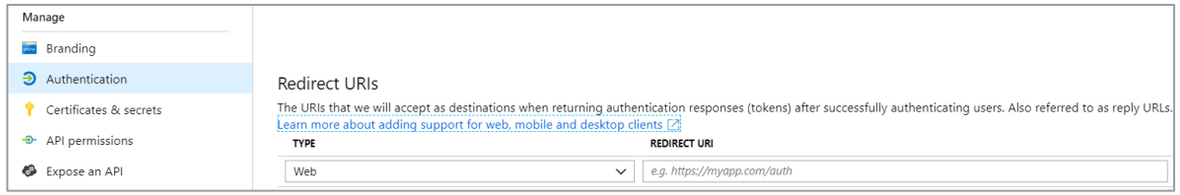


Setting Up for Service Principal Access – Part 2

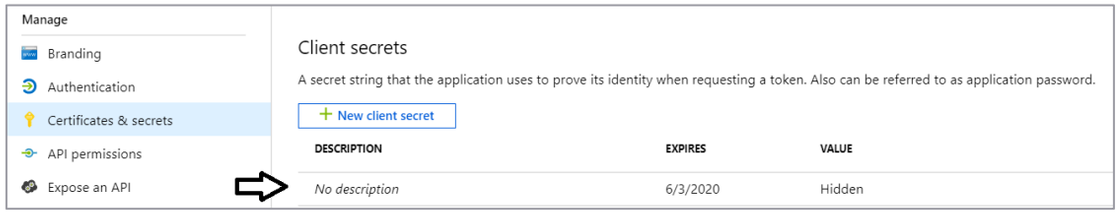
- Create a confidential client in your Azure AD tenant



- Configured as TYPE=Web and no need for a redirect URL



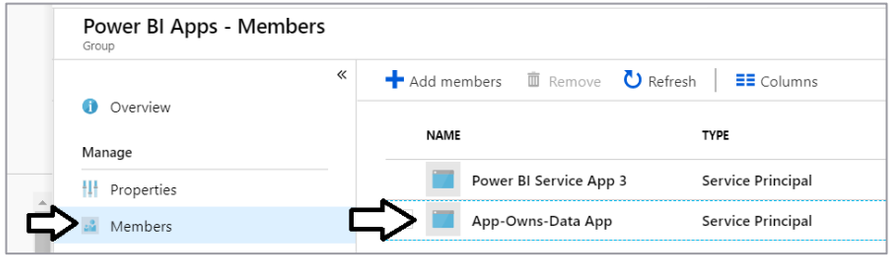
- Add a client secret or a client certificate



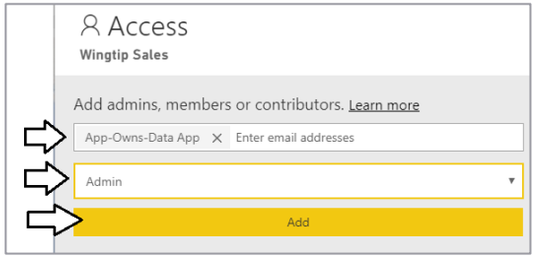
- No need to configure any permissions

Setting Up for Service Principal Access – Part 3

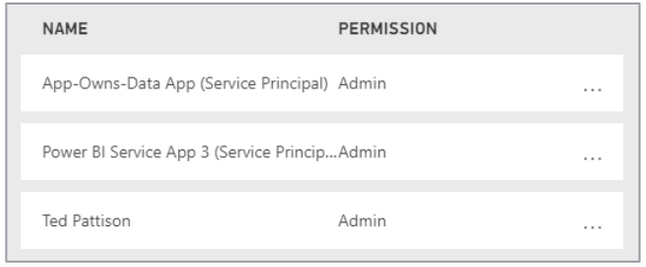
- Add application's service principal in Power BI Apps security group



- Configure application's service principal as workspace admin



- Service principal should now be workspace admin



Add Service Principal as Workspace Admin

- Make sure to use Service Principal ID and not Application ID

Add-Service-Principal-As-Workspace-Admin.ps1

```
Connect-PowerBIServiceAccount | Out-Null

$workspaceName = "Dev Camp Labs"

$servicePrincipalId = "c4143c3d-e853-42c5-a0ee-3eceac680305"

# get target workspace
$workspace = Get-PowerBIWorkspace -Name $workspaceName

Add-PowerBIWorkspaceUser -Scope Organization `
                         -Id $workspace.Id `
                         -AccessRight Admin `
                         -Identifier $servicePrincipalId `
                         -PrincipalType App
```

Dataset Takeover by Service Principal

Takeover-Dataset-as-Service-Principal-and-Refresh-Sql-Datasource.ps1

```powershell
# parse REST URL to take over dataset
$datasetTakeover = "groups/$workspaceId/datasets/$datasetId/Default.Takeover"

# execute POST to take over dataset
Invoke-PowerBIRestMethod -Method Post -Url $datasetTakeover -WarningAction Ignore

# get object for new SQL datasource
$datasource = Get-PowerBIDatasource -WorkspaceId $workspace.Id -DatasetId $dataset.Id

# parse REST to determine gateway Id and datasource Id
$workspaceId = $workspace.Id
$datasetId = $dataset.Id
$datasourceUrl = "groups/$workspaceId/datasets/$datasetId/datasources"

# execute REST call to determine gateway Id and datasource Id
$datasourcesResult = Invoke-PowerBIRestMethod -Method Get -Url $datasourceUrl | ConvertFrom-Json

# parse REST URL used to patch datasource credentials
$datasource = $datasourcesResult.value[0]
$gatewayId = $datasource.gatewayId
$datasourceId = $datasource.datasourceId
$datasourcePatchUrl = "gateways/$gatewayId/datasources/$datasourceId"

# create HTTP request body to patch datasource credentials
$patchBody = @{
  "credentialDetails" = @{
    "credentials" = "{""credentialData"":[{""name"":""username"",""value"":""$sqlUserName""},{""name"":""password"",""value"":""$sqlUserPassword""}]}"
    "credentialType" = "Basic"
    "encryptedConnection" =  "NotEncrypted"
    "encryptionAlgorithm" = "None"
    "privacyLevel" = "Organizational"
  }
}

# convert body contents to JSON
$patchBodyJson = ConvertTo-Json -InputObject $patchBody -Depth 6 -Compress

# execute PATCH request to set datasource credentials
Invoke-PowerBIRestMethod -Method Patch -Url $datasourcePatchUrl -Body $patchBodyJson

# parse REST URL for dataset refresh
$datasetRefreshUrl = "groups/$workspaceId/datasets/$datasetId/refreshes"

# execute POST to begin dataset refresh
Invoke-PowerBIRestMethod -Method Post -Url $datasetRefreshUrl -WarningAction Ignore
```

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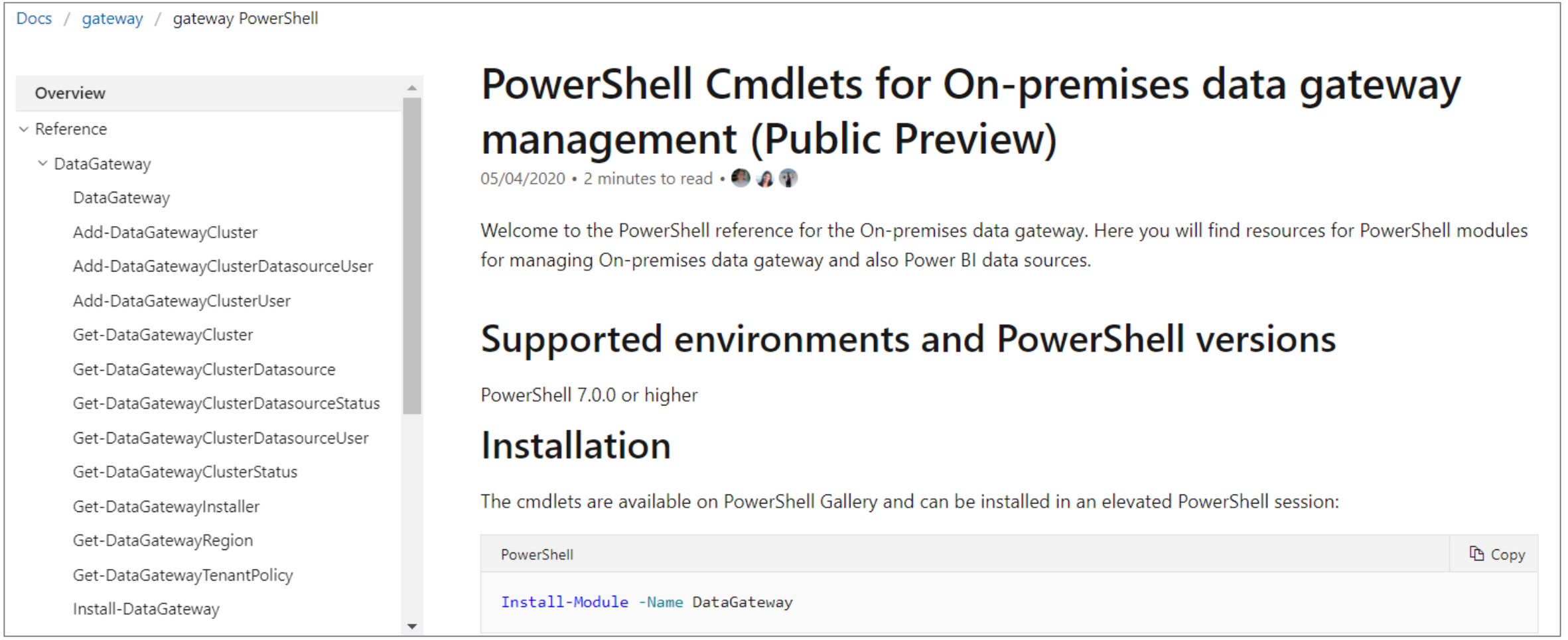
PowerShell Cmdlets for On-premises Data Gateway

https://docs.microsoft.com/en-us/powershell/gateway/overview?view=datagateway-ps



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Questions