Release Notes

Azure Cost Management Power BI Template

V1.2

10/06/2020

(GitHub) SAP on Azure Scripts
https://github.com/Azure/SAP-on-Azure-Scripts-and-Utilities

Table of Contents

1. INTRODUCTION

The purpose of this document is to describe the creation/fix/enhancement made to Azure Cost Management Power BI Template. The Power BI Template is based on the following Azure Cost Management APIs -

Azure Cost Management connector for Power BI (v2)
https://docs.microsoft.com/en-us/power-bi/connect-data/desktop-connect-azure-cost-management

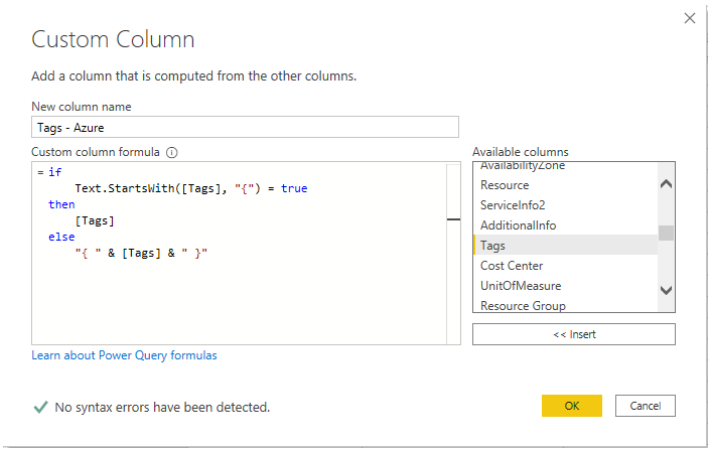
Azure Cost Consumption API v2
https://docs.microsoft.com/en-us/rest/api/consumption/

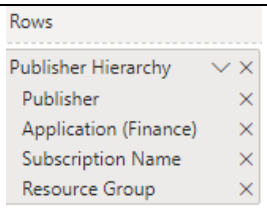
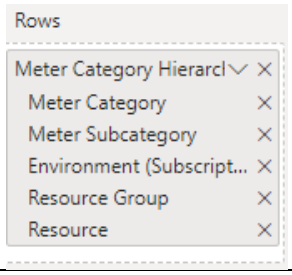
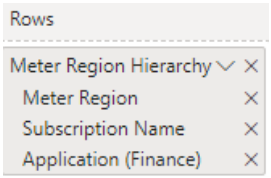
You can use the Azure Cost Management connector for Power BI Desktop to make powerful, customized visualizations and reports that help you better understand your Azure spend. The Azure Cost Management connector currently supports customers with a Microsoft Customer Agreement or an Enterprise Agreement (EA).

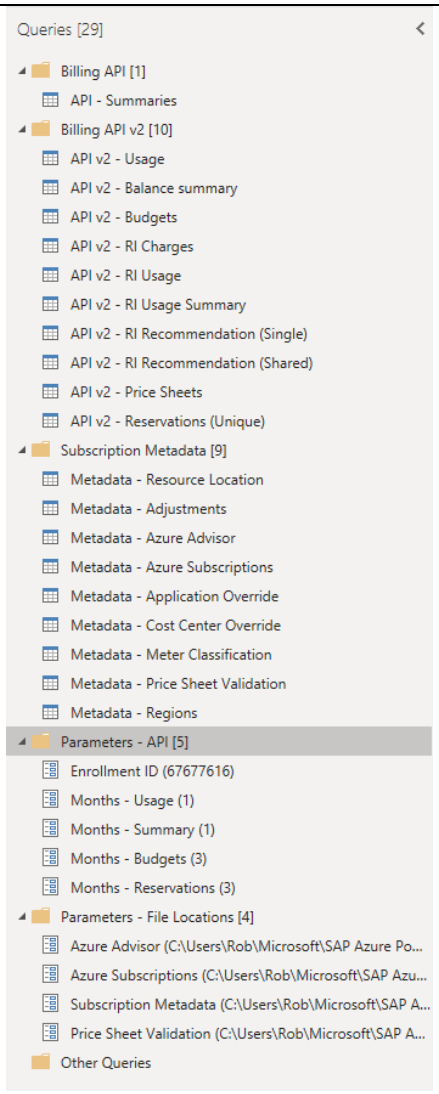
The Azure Cost Management connector uses OAuth 2.0 for authentication with Azure and identifies users who are going to use the connector. Tokens generated in this process are valid for a specific period. Power BI preserves the token for the next login. OAuth 2.0, is a standard for the process that goes on behind the scenes to ensure the secure handling of these permissions. To connect, you must use an Enterprise Administrator account for Enterprise Agreements, or a Billing account owner for Microsoft Customer Agreements.

2. RELEASE HISTORY

2.1 V1.2 - 10/06/2020

No.	Module	Description	New/ Fix/ Enhancement
1	APIv2 – Usage.[TAGS] JSON Field Validation	This version includes a JSON validation for the Usage. There is an issue with the current API Cost Management TAGS field where the JSON is not properly formatted with {} open / closed brackets. This version adds a 'CUSTOM COLUMN' to check for the proper JSON format.  Custom Column Function: See M-Code Below Highlighted `if Text.StartsWith([Tags], "{") = true then [Tags] else "{ " & [Tags] & " }"` Add a custom column in Power BI Desktop - Power BI | Microsoft Docs	Bug
2	Subscription Metadata File	The 'Regions' metadata was missing in the v1 release. It is an optional table used to augment Azure Usage by Region.	Bug
3	Price Sheet Validation File	This parameter should be a Excel spreadsheet filename with path. This is an Excel Data Source	Bug
4	Marketplace Publishers	Added the Marketplace Publisher Summary Marketplace Drill Down Hierarchy –	New

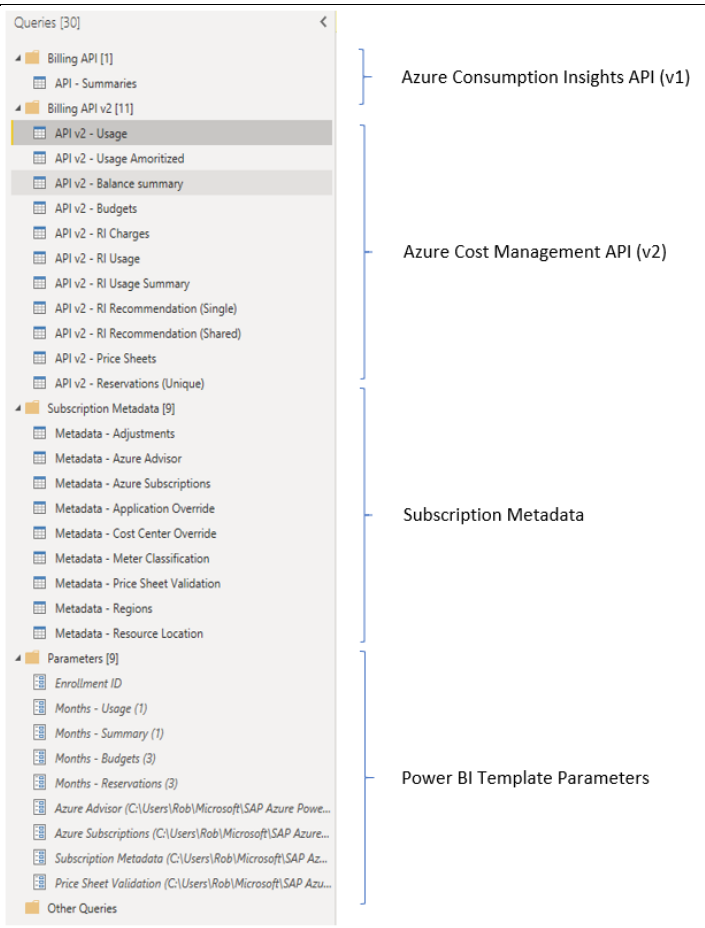
			
5	Meter Category Drill Down	All Meter Category Drill-Down visuals utilize the following hierarchy – 	Bug
6	Regions	The Cost per Region was not displaying region cost. This has been fixed. Additionally, the following drill-down visuals have been added – - Meter Region - Meter Category - Application (Finance) A new Meter Region Hierarchy has been added – 	Bug
7	Added New Group	Created new Groups for Parameters separating the parameters used for the API and parameters for metadata file locations 1) API Parameters Group 2) File Location Parameters	

		 Queries [29] Billing API [1] API - Summaries Billing API v2 [10] API v2 - Usage API v2 - Balance summary API v2 - Budgets API v2 - RI Charges API v2 - RI Usage API v2 - RI Usage Summary API v2 - RI Recommendation (Single) API v2 - RI Recommendation (Shared) API v2 - Price Sheets API v2 - Reservations (Unique) Subscription Metadata [9] Metadata - Resource Location Metadata - Adjustments Metadata - Azure Advisor Metadata - Azure Subscriptions Metadata - Application Override Metadata - Cost Center Override Metadata - Meter Classification Metadata - Price Sheet Validation Metadata - Regions Parameters - API [5] Enrollment ID (67677616) Months - Usage (1) Months - Summary (1) Months - Budgets (3) Months - Reservations (3) Parameters - File Locations [4] Azure Advisor (C:\Users\Rob\Microsoft\SAP Azure Po... Azure Subscriptions (C:\Users\Rob\Microsoft\SAP Azu... Subscription Metadata (C:\Users\Rob\Microsoft\SAP A... Price Sheet Validation (C:\Users\Rob\Microsoft\SAP A... Other Queries		

2.2 V1.0 - 09/24/2020 (Initial Release)

No.	Module	Description	New/ Fix/ Enhancement
6	Azure Databricks Cost Management		New
7	Cost Center Analysis	Daily Cost by Cost Center, Export view for Finance Teams	New
8	Cost Comparison	Cost Comparison by Meter Category Hierarchy Daily Cost Comparison Weekly Cost Comparison	New

9	Reservations	Reservation Cost Analysis Reservation Charges Reservation Usage Reservation Purchases by Week	New
10	Region Cost Management and Analysis	Azure Usage and Cost Analysis by Region	
11	Price Sheet	Price Sheet Validation Enrollment Discounts Price Sheet and Product SKU Lookup See Also Pricing Calculator | Microsoft Azure	New
12	Azure Advisor and Recommendations	View of Azure Advisor Recommendations. The Azure Advisor views are driven by an export from the Azure Advisor Recommendations in the Azure Portal (https://portal.azure.com) Cost Performance Security Reliability Operational Excellence See Also To Export Azure Advisor Recommendations - How to export an Azure Advisor recommendation report - Bing video	New
13	Power BI Parameters	Report Level Parameters configured by Customer the customer. These parameters drive the location of subscription, metadata, access to the Azure Cost Management API, and the # of months of data. Enrollment ID (API v1) *** Azure Subscription Metadata = %PATH% Months – Usage (2) Months – Summary (6) Months – Budgets (12) Months – Reservations (24) Months – Reservation (6) Azure Advisor = %PATH% See Also Power BI Query Parameters - Deep Dive into Query Parameters and Power BI Templates | Microsoft Power BI Blog | Microsoft Power BI	New

14	Drill-Down Hierarchy Levels for Cost Management and Analysis	Application Hierarchy Application Subscription Meter Category Meter Subcategory Resource Group Resource Application Region Hierarchy Application Region	New
15	Tables	 Note: API – Summaries is a v1 table from Azure Consumption Insights API.	New

3. STEPS FOR USING AZURE COST MANAGEMENT POWER BI TEMPLATE

1) Download Cost Management Template from Github

   SAP-on-Azure-Scripts-and-Utilities/Costmanagement-Dashboard at master · Azure/SAP-on-Azure-Scripts-and-Utilities · GitHub

2) Obtain Customer PBI Key for Consumption Insights (v1)

   This is required for the “API – Summaries” Table

   This table is not available in the Azure Cost Management API (v2)

   Connect to Azure Consumption Insights data in Power BI Desktop - Power BI | Microsoft Docs

3) Grant Power BI Access for Azure Cost Management connector for Power BI (v2)

   Connect to Azure Cost Management data in Power BI Desktop - Power BI | Microsoft Docs

4) Open Power BI Template (PBIT)

5) Update all Parameters

6) Update Subscription Metadata (Financial Best Practices)

7) Apply PBI Template with Customer Color Scheme (Power BI Theme)

   Use report themes in Power BI Desktop - Power BI | Microsoft Docs

8) Download Azure Advisor and Recommendations from Azure Portal

   How to export an Azure Advisor recommendation report - Bing video

9) Fine Tune for specific Customer Requirements

4. USAGE TABLE M QUERY

The Power BI **Advanced Editor** can be used to modify the Usage Table M code based on your Azure Tagging methodology. Please refer to the Power Query Editor -

[Query overview in Power BI Desktop - Power BI | Microsoft Docs]

```
let
    Source = AzureCostManagement.Tables("Enrollment Number", #"Enrollment ID", #"Months - Usage", []),
    usagedetails = Source{[Key="usagedetails"]}[Data],
    #"Removed Columns" = Table.RemoveColumns(usagedetails,{"BillingAccountName", "BillingProfileId",
"Product", "BillingProfileName", "ServiceFamily", "BillingCurrency", "ConsumedService",
"InvoiceSectionId", "InvoiceSection", "BillingAccountId", "ResourceId", "ServiceInfo1"}),
    #"Duplicated Column2" = Table.DuplicateColumn(#"Removed Columns", "Date", "Date - Copy"),
    #"Duplicated Column1" = Table.DuplicateColumn(#"Duplicated Column2", "Date - Copy", "Date - Copy -
Copy"),
    #"Calculated Day of Week" = Table.TransformColumns(#"Duplicated Column1",{{"Date - Copy",
Date.DayOfWeek, Int64.Type}}),
    #"Renamed Columns - Week Day #" = Table.RenameColumns(#"Calculated Day of Week",{{"Date - Copy", "Week
Day #"},{"SubscriptionName", "Subscription Name"}, {"CostCenter", "Cost Center"}, {"MeterCategory", "Meter
Category"}, {"MeterSubCategory", "Meter Subcategory"}, {"MeterRegion","Meter Region"},
{"ResourceName","Resource"}, {"MeterName", "Meter"}, {"ResourceGroup", "Resource Group"},
{"ReservationId", "Reservation Id"}, {"ReservationName", "Reservation Name"}, {"PublisherName",
"Publisher"}, {"BillingPeriodStartDate", "Billing Period (Start)"}, {"BillingPeriodEndDate", "Billing
Period (End)"}}),
    #"Extracted Day Name" = Table.TransformColumns(#"Renamed Columns - Week Day #", {{"Date - Copy -
Copy", each Date.DayOfWeekName(_), type text}}),
    #"Renamed Columns - Weekday" = Table.RenameColumns(#"Extracted Day Name",{{"Date - Copy - Copy",
"Weekday"}}),
    #"Step 1 - Merge Azure Metadata (Merged Queries)" = Table.NestedJoin(#"Renamed Columns - Weekday",
{"SubscriptionId"}, #"Metadata - Azure Subscriptions", {"Subscription Id"}, "Excel - Azure Subscriptions",
JoinKind.LeftOuter),
    #"Step 1.1 - Select Azure Metadata Fields (Expanded Excel)" = Table.ExpandTableColumn(#"Step 1 - Merge
Azure Metadata (Merged Queries)", "Excel - Azure Subscriptions", {"Default CC", "Application", "Client",
"Business", "Company", "Owner", "Environment", "State", "Subscription Owner", "Function"}, {"Excel - Azure
Subscriptions.Default CC", "Excel - Azure Subscriptions.Application", "Excel - Azure
Subscriptions.Client", "Excel - Azure Subscriptions.Business", "Excel - Azure Subscriptions.Company",
"Excel - Azure Subscriptions.Owner", "Excel - Azure Subscriptions.Environment", "Excel - Azure
Subscriptions.State", "Excel - Azure Subscriptions.Subscription Owner", "Excel - Azure
Subscriptions.Function"}),
    #"Step 1.2 - Rename Default Fields (Renamed)" = Table.RenameColumns(#"Step 1.1 - Select Azure Metadata
Fields (Expanded Excel)",{{"Excel - Azure Subscriptions.Application", "Application (Subscription)"},
{"Excel - Azure Subscriptions.Default CC", "Cost Center (Subscription)"}, {"Excel - Azure
Subscriptions.Business", "Business (Subscription)"}, {"Excel - Azure Subscriptions.Company", "Company
(Subscription)"}, {"Excel - Azure Subscriptions.Client", "Client (Subscription)"}, {"Excel - Azure
Subscriptions.Owner", "Owner (Subscription)"}, {"Excel - Azure Subscriptions.Environment", "Environment
(Subscription)"}, {"Excel - Azure Subscriptions.State", "Status (Subscription)"}, {"Excel - Azure
Subscriptions.Subscription Owner", "Subscription Owner"}, {"Excel - Azure Subscriptions.Function", "POC
Function"}, {"Cost", "Cost (Actual)"}}),
    #"Step 1.3 - Default Metadata Fields Changed Type)" = Table.TransformColumnTypes(#"Step 1.2 - Rename
Default Fields (Renamed)",{{"Cost Center", type text}}),
    #"TAGS - JSON Format {}" = Table.AddColumn(#"Step 1.3 - Default Metadata Fields Changed Type)", "Tags
- Azure", each if
Text.StartsWith([Tags], "{") = true   then
[Tags]
else
"{ " & [Tags] & " }"),
    #"Azure-Tags (Changed Type)" = Table.TransformColumnTypes(#"TAGS - JSON Format {}",{{"Tags - Azure",
type text}}),
    #"Step 2.1 - Parse Azure Tags (JSON)" = Table.TransformColumns(#"Azure-Tags (Changed Type)",{{"Tags -
Azure", Json.Document}}),
    #"Step 2.2 - Select Azure Tags (JSON)" = Table.ExpandRecordColumn(#"Step 2.1 - Parse Azure Tags
(JSON)", "Tags - Azure", {"ApplicationName", "CostCenter", "ComponentName", "ClientName"}, {"Tags -
Azure.ApplicationName", "Tags - Azure.CostCenter", "Tags - Azure.ComponentName", "Tags -
Azure.ClientName"}),
    #"Step 2.3.1 - Application - Tagged (Replace Errors)" = Table.ReplaceErrorValues(#"Step 2.2 - Select
Azure Tags (JSON)", {{"Tags - Azure.ApplicationName", "n/a"}}),
    #"Step 2.3.2 - Application - Tagged (Replace NULL Values)" = Table.ReplaceValue(#"Step 2.3.1 -
Application - Tagged (Replace Errors)",null,"n/a",Replacer.ReplaceValue,{"Tags - Azure.ApplicationName"}),
```

```
    #"Step 2.3.3 - Application - Tagged (Replace Empty Values)" = Table.ReplaceValue(#"Step 2.3.2 -
Application - Tagged (Replace NULL Values)","","n/a",Replacer.ReplaceValue,{"Tags -
Azure.ApplicationName"}),
    #"Step 2.3.4 - Application - Tagged (Trimmed Text)" = Table.TransformColumns(#"Step 2.3.3 -
Application - Tagged (Replace Empty Values)",{{"Tags - Azure.ApplicationName", Text.Trim, type text}}),
    #"Step 2.3.5 - Application (Tagged) (Rename Column)" = Table.RenameColumns(#"Step 2.3.4 - Application
- Tagged (Trimmed Text)",{{"Tags - Azure.ApplicationName", "Application (Tagged)"}}),
    #"Step 2.4.1 - Cost Center - Tagged (Replace Errors)" = Table.ReplaceErrorValues(#"Step 2.3.5 -
Application (Tagged) (Rename Column)", {{"Tags - Azure.CostCenter", "n/a"}}),
    #"Step 2.4.2 - Cost Center - Tagged (Replace NULL Values)" = Table.ReplaceValue(#"Step 2.4.1 - Cost
Center - Tagged (Replace Errors)",null,"n/a",Replacer.ReplaceValue,{"Tags - Azure.CostCenter"}),
    #"Step 2.4.3 - Cost Center - Tagged (Replace Empty Values)" = Table.ReplaceValue(#"Step 2.4.2 - Cost
Center - Tagged (Replace NULL Values)","","n/a",Replacer.ReplaceValue,{"Tags - Azure.CostCenter"}),
    #"Step 2.4.4 - Cost Center (Tagged) (Rename Column)" = Table.RenameColumns(#"Step 2.4.3 - Cost Center
- Tagged (Replace Empty Values)",{{"Tags - Azure.CostCenter", "Cost Center (Tagged)"}}),
    #"Step 2.5.1 - ClientName - Tagged (Replace Errors)" = Table.ReplaceErrorValues(#"Step 2.4.4 - Cost
Center (Tagged) (Rename Column)", {{"Tags - Azure.ClientName", "n/a"}}),
    #"Step 2.5.2 - ClientName - Tagged (Replaced NULL Values)" = Table.ReplaceValue(#"Step 2.5.1 -
ClientName - Tagged (Replace Errors)",null,"n/a",Replacer.ReplaceValue,{"Tags - Azure.ClientName"}),
    #"Step 2.5.3 - ClientName - Tagged (Change Data Type)" = Table.TransformColumnTypes(#"Step 2.5.2 -
ClientName - Tagged (Replaced NULL Values)",{{"Tags - Azure.ClientName", type text}}),
    #"Step 2.5.4 - ClientName (Tagged) (Rename Column)" = Table.RenameColumns(#"Step 2.5.3 - ClientName -
Tagged (Change Data Type)",{{"Tags - Azure.ClientName", "Client (Tagged)"}}),
    #"Step 2.6.1 - Component - Tagged (Replace Errors)" = Table.ReplaceErrorValues(#"Step 2.5.4 -
ClientName (Tagged) (Rename Column)", {{"Tags - Azure.ComponentName", "n/a"}}),
    #"Step 2.6.2 - Component - Tagged (Replace NULL Values)" = Table.ReplaceValue(#"Step 2.6.1 - Component
- Tagged (Replace Errors)",null,"n/a",Replacer.ReplaceValue,{"Tags - Azure.ComponentName"}),
    #"Step 2.6.3 - Component - Tagged (Change Data Type)" = Table.TransformColumnTypes(#"Step 2.6.2 -
Component - Tagged (Replace NULL Values)",{{"Tags - Azure.ComponentName", type text}}),
    #"Step 2.6.4 - Component (Tagged) (Rename Column)" = Table.RenameColumns(#"Step 2.6.3 - Component -
Tagged (Change Data Type)",{{"Tags - Azure.ComponentName", "Component"}}),
    #"Step 3 - Application (Override) (Merge Query)" = Table.NestedJoin(#"Step 2.6.4 - Component (Tagged)
(Rename Column)", {"Application (Tagged)"}, #"Metadata - Application Override", {"Application (Tagged)"},
"Excel - Application Override", JoinKind.LeftOuter),
    #"Step 3.1 - Application (Override) (Expanded Excel)" = Table.ExpandTableColumn(#"Step 3 - Application
(Override) (Merge Query)", "Excel - Application Override", {"Application (Override)"}, {"Excel -
Application Override.Application (Override)"}),
    #"Step 3.2 - Application (Override) (Rename Column)" = Table.RenameColumns(#"Step 3.1 - Application
(Override) (Expanded Excel)",{{"Excel - Application Override.Application (Override)", "Application
(Override)"}}),
    #"Step 4 - Application (Finance) - Add Conditional Column" = Table.AddColumn(#"Step 3.2 - Application
(Override) (Rename Column)", "Application (Finance)", each if [#"Application (Override)"] = null then
[#"Application (Subscription)"] else [#"Application (Override)"]),
    #"Step 4.1 - Application (Finance) (Change Data Type)" = Table.TransformColumnTypes(#"Step 4 -
Application (Finance) - Add Conditional Column",{{"Application (Finance)", type text}}),
    #"Step 5 - Cost Center (N/A Value) - Add Conditional Column" = Table.AddColumn(#"Step 4.1 -
Application (Finance) (Change Data Type)", "Cost Center (N/A Value)", each if [#"Cost Center (Tagged)"] =
"n/a" then [#"Cost Center (Subscription)"] else [#"Cost Center (Tagged)"]),
    #"Step 5.1 - Cost Center (N/A Value) (Change Data Type)" = Table.TransformColumnTypes(#"Step 5 - Cost
Center (N/A Value) - Add Conditional Column",{{"Cost Center (N/A Value)", type text}}),
    #"Step 6 - Cost Center (Override) (Merge Query)" = Table.NestedJoin(#"Step 5.1 - Cost Center (N/A
Value) (Change Data Type)", {"Cost Center (N/A Value)"}, #"Metadata - Cost Center Override", {"Cost Center
(Tagged)"}, "Excel - Cost Center Override", JoinKind.LeftOuter),
    #"Step 6.1 - Cost Center (Override) (Expanded Excel)" = Table.ExpandTableColumn(#"Step 6 - Cost Center
(Override) (Merge Query)", "Excel - Cost Center Override", {"Cost Center (Override)"}, {"Excel - Cost
Center Override.Cost Center (Override)"}),
    #"Step 6.2 - Cost Center (Override) (Rename Column)" = Table.RenameColumns(#"Step 6.1 - Cost Center
(Override) (Expanded Excel)",{{"Excel - Cost Center Override.Cost Center (Override)", "Cost Center
(Override)"}}),
    #"Step 7 - Cost Center (Finance) (Add Conditional Column)" = Table.AddColumn(#"Step 6.2 - Cost Center
(Override) (Rename Column)", "Cost Center (Finance)", each if [#"Cost Center (Override)"] = null then
[#"Cost Center (N/A Value)"] else [#"Cost Center (Override)"]),
    #"Step 7.1 - Cost Center Finance (Change Data Type)" = Table.TransformColumnTypes(#"Step 7 - Cost
Center (Finance) (Add Conditional Column)",{{"Cost Center (Finance)", type text}}),
    #"Step 8 - Client (Finance) - Added Conditional Column" = Table.AddColumn(#"Step 7.1 - Cost Center
Finance (Change Data Type)", "Client (Finance)", each if [#"Client (Tagged)"] = "n/a" then [#"Client
(Subscription)"] else [#"Client (Tagged)"]),
    #"Step 8.1 - Client (Finance) (Change Data Type)" = Table.TransformColumnTypes(#"Step 8 - Client
(Finance) - Added Conditional Column",{{"Client (Finance)", type text}}),
    #"Week End Date" = Table.AddColumn(#"Step 8.1 - Client (Finance) (Change Data Type)", "Week End Date",
each Date.EndOfWeek([Date],Day.Monday)),
    #"Final Step" = Table.TransformColumnTypes(#"Week End Date",{{"Week End Date", type date}})
in
    #"Final Step"
```

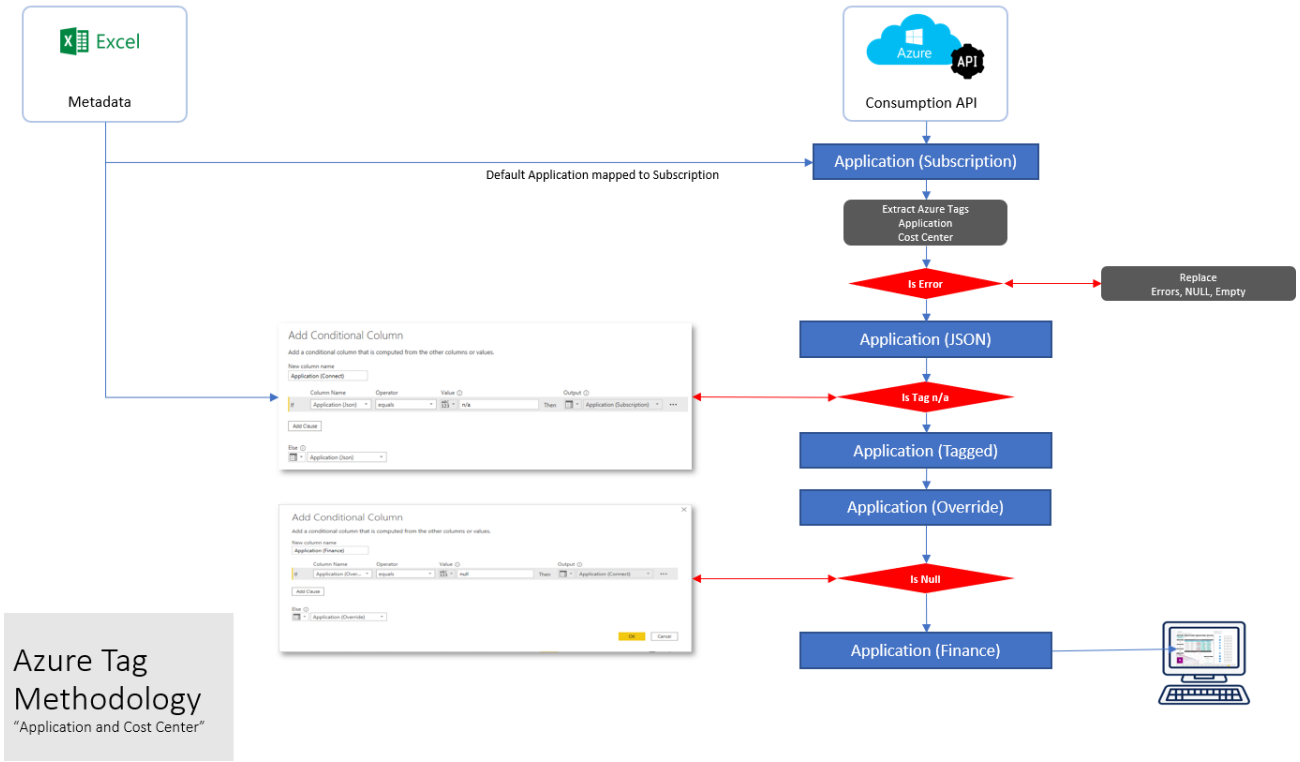
5. AZURE TAGGING OVERRIDE METHODOLOGY FOR APPLICATIONS AND COST CENTERS

The Azure Cost Management Power BI Dashboard uses the following TAGS:

1) “ApplicationName”
2) “Cost Center”
3) “ComponentName”
4) “ClientName”

```
#"Step 2.2 - Select Azure Tags (JSON)" = Table.ExpandRecordColumn(#"Step 2.1 - Parse Azure Tags (JSON)",
"Tags - Azure", {"ApplicationName", "CostCenter", "ComponentName", "ClientName"}, {"Tags -
Azure.ApplicationName", "Tags - Azure.CostCenter", "Tags - Azure.ComponentName", "Tags -
Azure.ClientName"}),
```

These TAGS should be modified according to your Azure Tagging methodology.



6. REFERENCES

Understanding Azure Reservations
Understand Azure reservations usage for Enterprise Agreements | Microsoft Docs

Azure Cost Management
Connect to Azure Cost Management data in Power BI Desktop - Power BI | Microsoft Docs

Incremental Refresh with Power BI Premium
Incremental refresh in Power BI - Power BI | Microsoft Docs

Refresh Power BI Reports Programmatically (Github Blog dubracik/pbixrefresher-python)
GitHub - dubravcik/pbixrefresher-python: Refresh Power BI reports programmatically for free

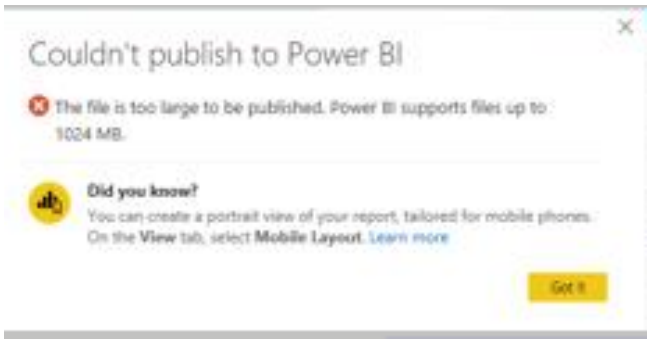
Understanding Microsoft Customer Agreement Administrative Roles in Azure
Billing roles for Microsoft Customer Agreements - Azure | Microsoft Docs

Refresh Power BI Datasets using Microsoft Flow
Refresh your Power BI dataset using Microsoft Flow | Microsoft Power BI Blog | Microsoft Power BI

Write Back to SQL Database from Power BI
https://bielite.com/blog/write-back-to-sql-database-from-power-bi/

7. TROUBLESHOOTING

7.1 Power BI Pro Publish Limit – 1024 MB



[PowerBI Data Refresh Limitations & Restrictions for Pro and Premium user (gigxp.com)]

7.2 API v2 Connection Error

```
DataSource.Error: Web.Contents failed to get contents from
'https://management.azure.com/providers/Microsoft.Billing/billingAccounts/83294316
/providers/Microsoft.Consumption/reservationdetails?api-version=2019-05-
01&$filter=properties/UsageDate+ge+2020-07-01+AND+properties/UsageDate+le+2020-08-
04' (400): Bad Request
Details:
    DataSourceKind=AzureCostManagement
    DataSourcePath=Enrollment Number;9999999
    Url=https://management.azure.com/providers/Microsoft.Billing/billingAccounts/8
3294316/providers/Microsoft.Consumption/reservationdetails?api-version=2019-05-
01&$filter=properties/UsageDate+ge+2020-07-01+AND+properties/UsageDate+le+2020-08-
04
```