Azure Cost Management Connector for Power BI Desktop

Tailored Cost Management Accelerator Template

Contoso Version Template (PBIT)

Last Updated:
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V2.12.22

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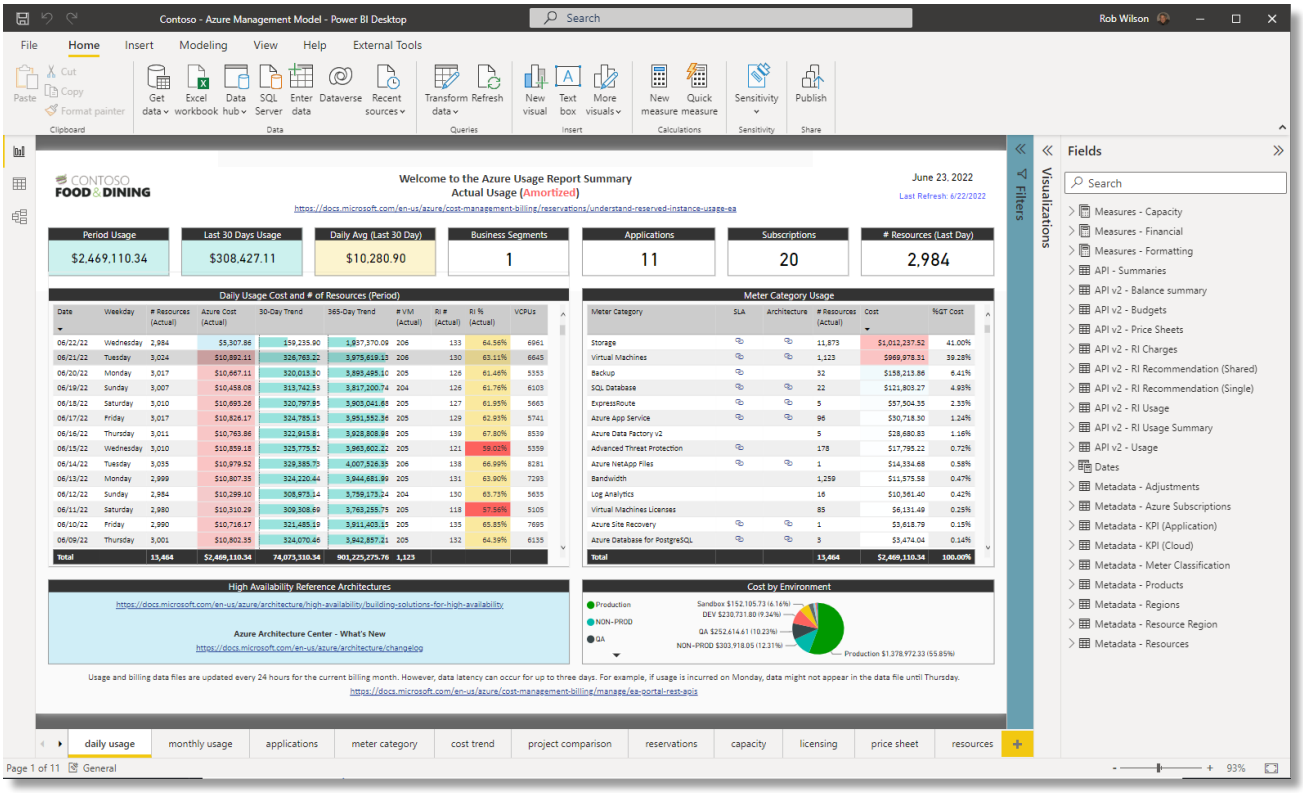
Contoso Power BI Desktop Template for Azure EA Cost Management

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 direct Microsoft Customer Agreement or an Enterprise Agreement (EA).

This Contoso Power BI Template is provided "as-is" and should be used as an accelerator to help learn the core concepts of the Cost Management Connector for Power BI Desktop.



Cost Management Connector for Power BI Desktop

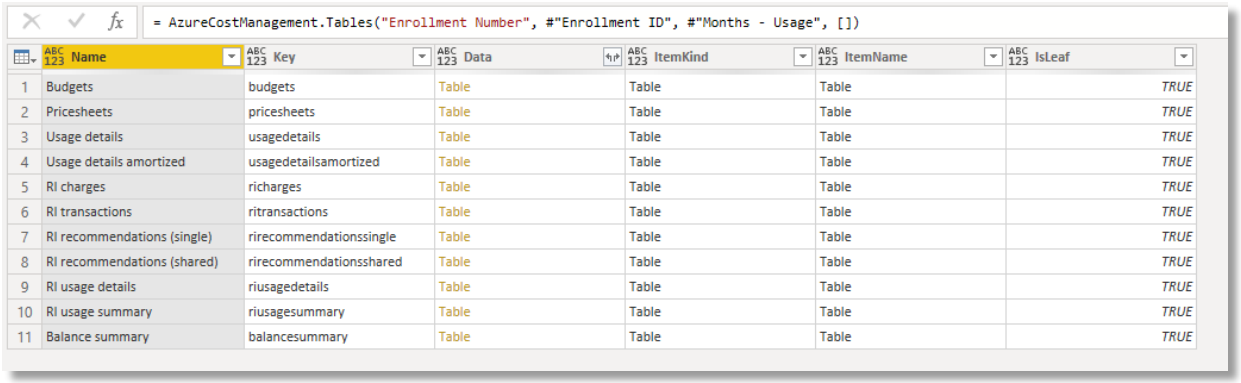
The Contoso Power BI Azure Cost Management Template uses the following Connectors -

Azure Cost Management Connector for Power BI Desktop (GA Release)

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 have appropriate permissions at the billing account or billing profile levels for Microsoft Customer Agreements.

This template uses the following Connector APIs –

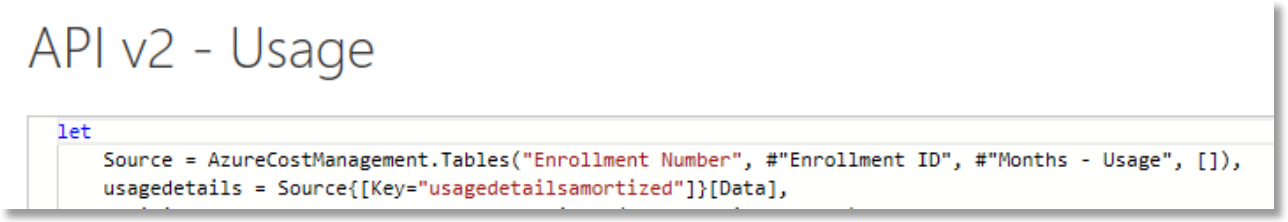
- Balance Summary
- Budgets
- Price Sheets
- RI Charges
- RI Recommendations (Shared)
- RI Recommendations (Single)
- RI Usage
- RI Usage Summary
- Usage (Note: Template currently configured to use the AMORTIZED table)



```
= AzureCostManagement.Tables("Enrollment Number", #"Enrollment ID", #"Months - Usage", [])
```

	Name	Key	Data	ItemKind	ItemName	IsLeaf
1	Budgets	budgets	Table	Table	Table	TRUE
2	Pricesheets	pricesheets	Table	Table	Table	TRUE
3	Usage details	usagedetails	Table	Table	Table	TRUE
4	Usage details amortized	usagedetailsamortized	Table	Table	Table	TRUE
5	RI charges	richarges	Table	Table	Table	TRUE
6	RI transactions	ritransactions	Table	Table	Table	TRUE
7	RI recommendations (single)	rirecommendationssingle	Table	Table	Table	TRUE
8	RI recommendations (shared)	rirecommendationsshared	Table	Table	Table	TRUE
9	RI usage details	riusagedetails	Table	Table	Table	TRUE
10	RI usage summary	riusagesummary	Table	Table	Table	TRUE
11	Balance summary	balancesummary	Table	Table	Table	TRUE

Each table in the Azure Cost Management Dashboard uses the `AzureCostManagement` API.



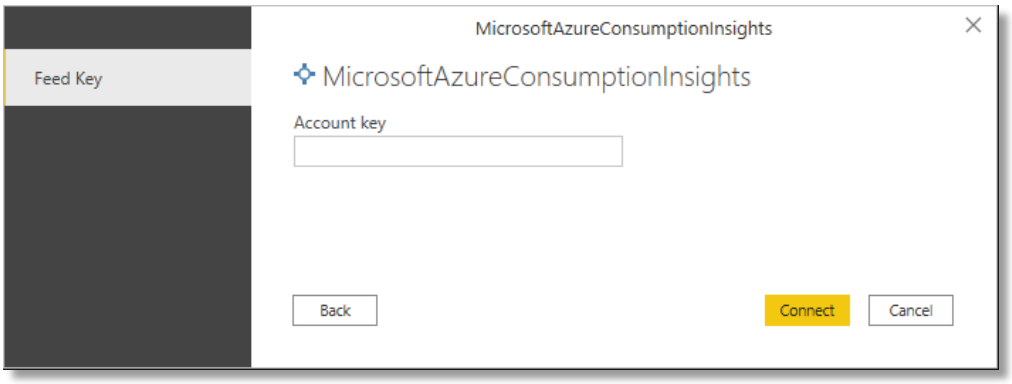
REFERENCE – AZURE COST MANAGEMENT CONNECTOR IN POWER BI
https://docs.microsoft.com/en-us/power-bi/connect-data/desktop-connect-azure-cost-management

Azure Consumption Insights and Azure Cost Management (Depreciated)

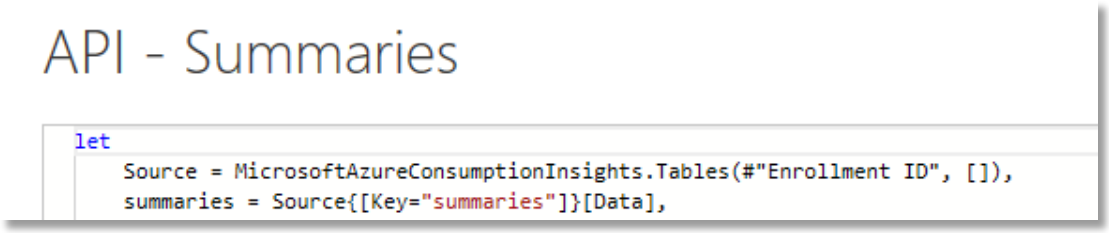
While this Connector has been depreciated, this template does utilize 1 table that is not currently available in the current connector. The table is -

- Summaries. This table is not in the v2 API and provides a monthly summary of all usage / credits / debits / marketplace purchases

To enable this table, you will need to provide your `Access Key` to connect –



The Azure Cost Management Dashboard only uses the **`summaries`** table from the Azure Consumption Insights API. As follows -



If you elect to remove the `summaries` table, month-over-month cost summary are available in the Azure Portal. In the Azure Portal, navigate as follows -

Azure Portal → Cost Management → Billing → Credits + Commitments

REFERENCE – CONNECT TO AZURE CONSUMPTION INSIGHTS DATA IN POWER BI DESKTOP (DEPRECIATED)
https://docs.microsoft.com/en-us/power-bi/connect-data/desktop-connect-azure-consumption-insights

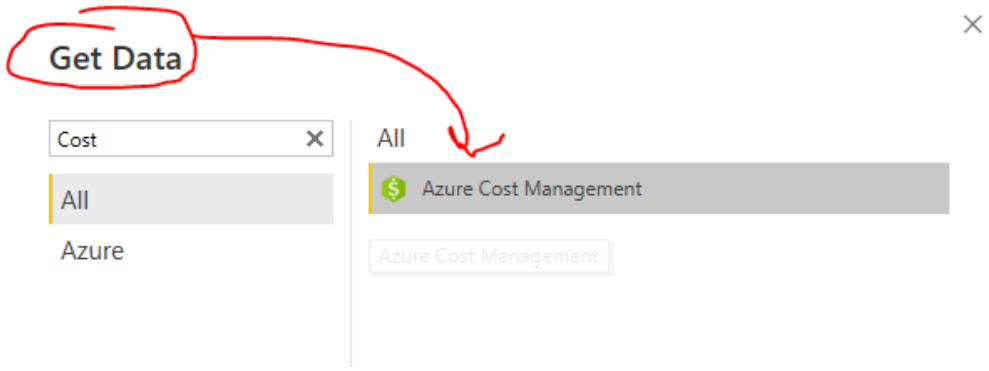
Template Setup and Initial Configuration

Step 1: Configure Connector Access and Permission

To enable to the PBI template, you will requirement the following access -

1) **Assign Access (Enrollment Reader Role). Please see Azure Cost Management Connector for Power BI (v2)**
   https://docs.microsoft.com/en-us/power-bi/connect-data/desktop-connect-azure-cost-management

   Recommendation: Before attempting to use the template, validate access by opening a blank Power BI Desktop file and connecting to the Azure Cost Management API. If successful, you will see the above APIs.

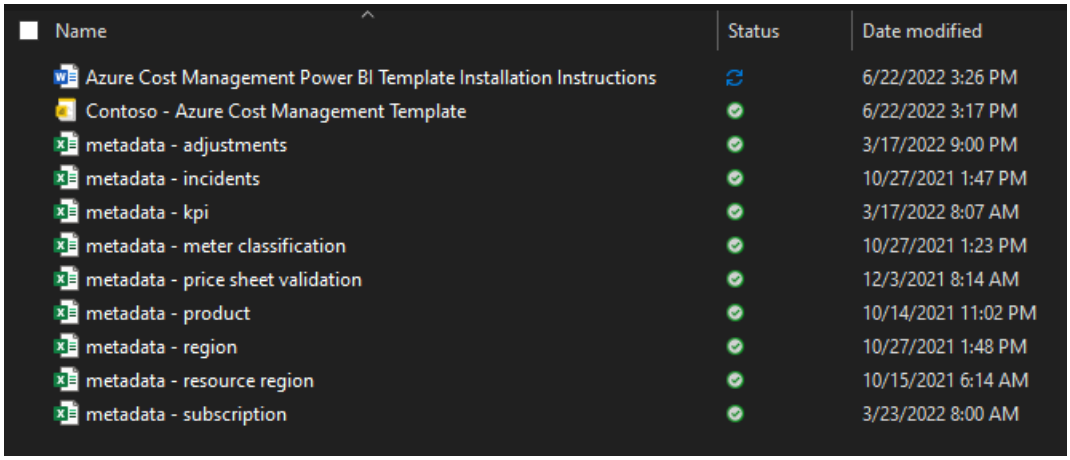


2) **Generate a Power BI Key. Please see Azure Consumption Insights (v1) (Depreciated)**
https://docs.microsoft.com/en-us/power-bi/connect-data/desktop-connect-azure-consumption-insights

Step 2: Copy Contoso Template and Metadata Files to New Location

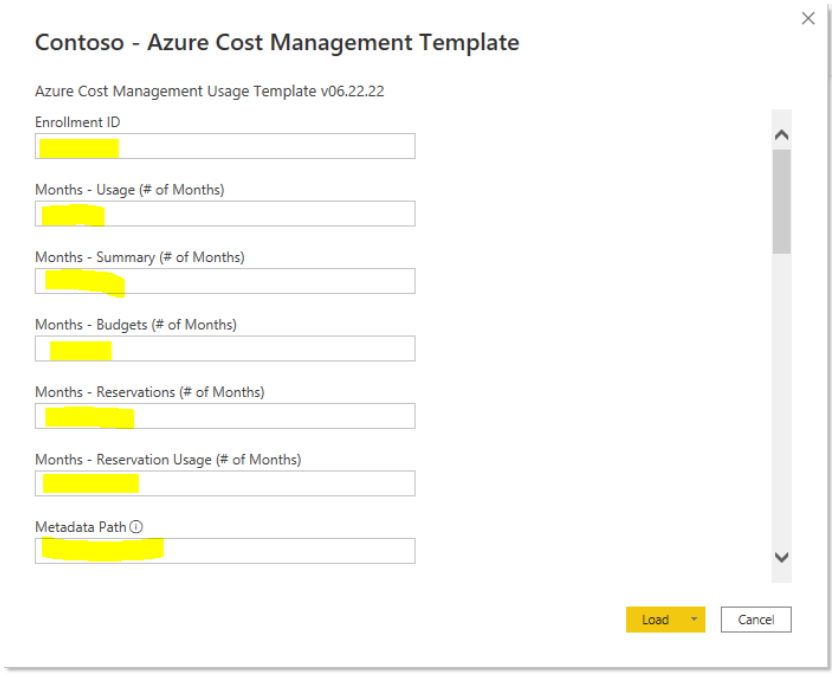
After you have confirmed access to the Azure Cost Management APIs, copy the Contoso – Azure Cost Management Template and all associated files to a new location.

The files are as follows -



Recommendation: Copy to the Private Teams channel created by your Microsoft Account Team. This will make it easier for our team to help your team configure the template and run against your Azure Enrollment. However, these files can reside on another location.

Step 3: Set Template Parameters



Run the Contoso Power BI Azure Cost Management Template (.pbit) and configure the following parameters on install -

1) Azure API Parameters

1. Enrollment ID. This is the "Billing Account ID"

   To find the enrollment ID
   Navigate to the Azure Portal → Cost Management + Billing → Overview → Essentials

2. Months – Usage (# of Months) – Recommend: 1
3. Months – Summary (# of Months) – Recommend: 1
4. Months – Budgets (# of Months) – Recommend: 1
5. Months – Reservations (# of Months) – Recommend: 12
6. Months – Reservation Usage (# of Months) – Recommend: 1
7. Metadata Path

   Example
   C:\Users\Rob\Microsoft\(EXT) Azure Cost Management - Template (Contoso)

2) Date Dimension Parameters

The following parameters are used for the Date Dimension table

1. Date Dim Start Date
2. Date Dim End Date

3) Metadata Location Parameters

The following parameter provides the path to the metadata files used in the template.

1. Metadata Path – Provide the fully qualified path for the metadata files

4) Metadata File Parameters

The following parameters are the filenames (no path) for each metadata file used in the templated.

1. Azure Subscription Metadata (Filename only) e.g. “metadata – subscription.xlsx”
2. Incidents (Filename only) – Not currently used in template
3. Meter Classification (Filename)
4. Price Sheet Validation (Filename) – Not currently used in template
5. Products (Filename)
6. Regions (Filename)
7. Resource Forecast (Filename)
8. Resource Region (Filename)
9. Adjustments (Filename)

5) Azure TAG Parameters

The following parameters are used for TAGS. There are 5 Tags used in the PBIT template. Please review with the RELX cloud team and Microsoft CSA team. These tags are critical for cost modeling accuracy.

1. Application
2. Component
3. Cost Center
4. Environment
5. Project
6. Databricks (Optional)

REFERENCE – AZURE RESOURCE TAGGING
https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/decision-guides/resource-tagging/

6) Developer Mode Flag Parameter

1. Developer Mode (Y/N)
2. # of Records to Return – Configured in the API v2 – Usage Power Query Script

```
usagedetails = Source{[Key="usagedetailsamortized"]}[Data],
                #"Limit Rows for Development"
        Table.FirstN(usagedetails,25000),
        RowsToReturn =
   if Development = "Y"
   then #"Limit Rows for Development"
   else usagedetails,
```

REFERENCE – POWER QUERY TABLE.FIRSTN FUNCTION()
https://docs.microsoft.com/en-us/powerquery-m/table-firstn

7) Database Parameters (Future Use Optional)

The following parameters are placeholders for future use. A database connection is not used in the template. All metadata files have been converted to excel / csv files for portability.

For future use, please update parameters with DB connection information. For example -

1. SQL DB (Optional) – Not used in this template
2. SQL Connection (Optional) – Not used in this template

Step 4: Save Template to PBIX and Refresh Data

After all parameters has been updated, save (“**SAVE AS”)** the template as a Power BI Desktop file “.pbix”

Run the Power BI Desktop file “.pbix”

Based prior implementations, there may be a few minor errors. The most common errors have been attributed to access, permissions, and file (metadata) locations. Please see my recommendation above on testing with a blank Power BI Desktop file before running the template.

Historically, I have seen most clients get up and running in approximately 1 – 1 ½ hours. I can be available to help configure the base template.

Post Template Configurate and Successful Refresh

1) Backup "API v2 – Usage" Power Query M Script

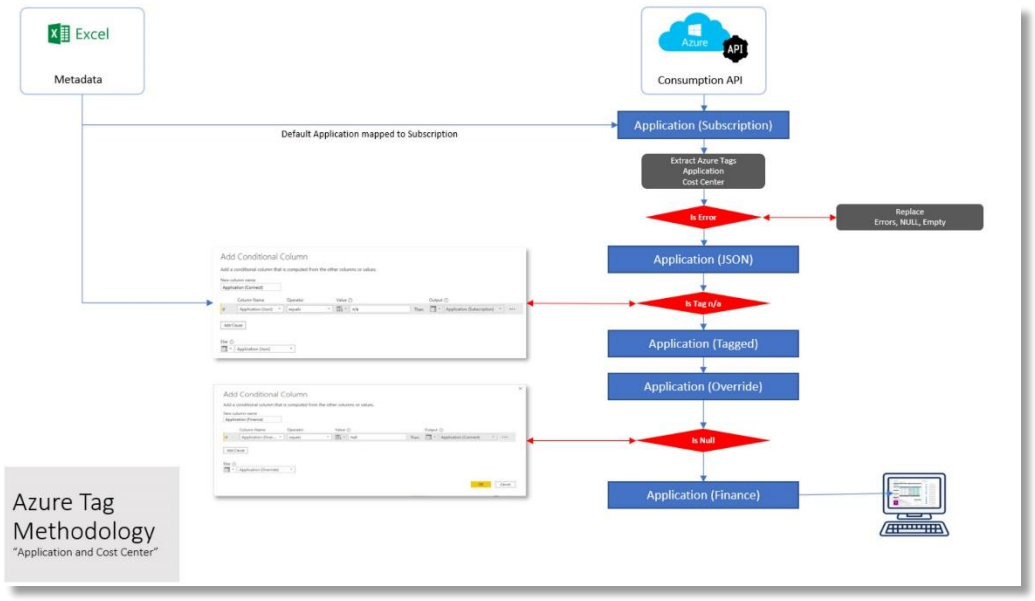
The applied steps in the `API v2 – Usage` Power Query M script contains the primary transformation logic for all Azure usage in the template. It incorporates many data elements from the metadata files. After installation, create a backup of the `API v2 – Usage` Power Query M Script before making any modifications.

REFERENCE: POWER QUERY M FORMULA LANGUAGE
https://docs.microsoft.com/en-us/powerquery-m/

2) Review "API v2 – Usage" M Script Applied Steps

The applied steps in the "`API v2 – Usage`" script contains the primary transformation logic for all Azure usage in the template. It incorporates many data elements from the metadata files. After installation, review the logic against reporting requirements for your organization. Based on your organization requirements, it is expected that this script would be updated -

- Add / remove new business logic
- Add / remove transformations
- Add / remove Azure tags
- Add / remove metadata tables
- Add / remove transformations to model organizational finance requirements



REFERENCE – USING THE APPLIED STEPS LIST
https://docs.microsoft.com/en-us/power-query/applied-steps

3) Review Removed Columns from the "API v2 – Usage" Code

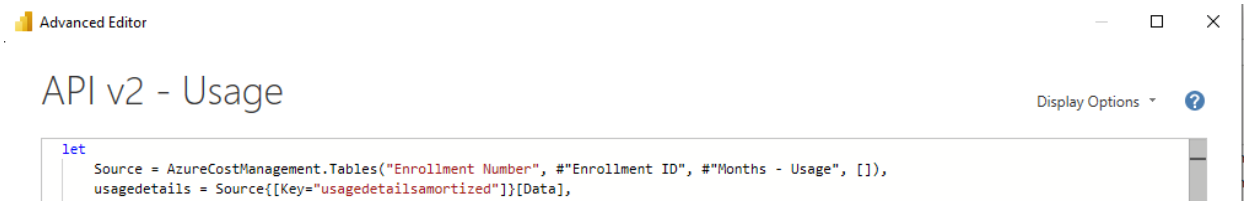
A Power BI Performance Best Practice is to only use Columns required for reporting. After installation, review all columns and removed columns against your organizations reporting requirements.

In the Power Query Editor, open the [API v2 – Usage] scription and review the template removed columns in Step #1. The following columns have been removed in the template –

```
#"Step 1 - Remove Columns" = Table.RemoveColumns(usagedetails,{"BillingAccountId",
"BillingProfileName", "AccountName", "AccountOwnerId", "AvailabilityZone",
"BillingAccountName", "BillingCurrency", "BillingPeriodStartDate", "BillingProfileId",
"ConsumedService", "Frequency", "IsAzureCreditEligible", "InvoiceSectionId",
"InvoiceSection", "ProductOrderId", "ProductOrderName", "PayGPrice", "PricingModel",
"Product", "PlanName", "ResourceId", "ServiceFamily"}),
```

4) Review Amortized Cost Data Set vs. Actual Cost Data Set Reporting

The template is configured use the **Amortized Cost** data set.



Please review the two separate data sets and modify the [API v2 – Usage] source as required by your organizations requirements.

```
let
    Source = AzureCostManagement.Tables("Enrollment Number", #"Enrollment ID", #"Months
- Usage", []),
    usagedetails = Source{[Key="usagedetailsamortized"]}[Data],
```

Actual Cost - Provides data to reconcile with your monthly bill. This data has reservation purchase costs and reservation application details. With this data, you can know which subscription or resource group or resource received the reservation discount in a particular day. The EffectivePrice for the usage that receives the reservation discount is zero.

Amortized Cost - This dataset is similar to the Actual Cost dataset except that - the EffectivePrice for the usage that gets reservation discount is the prorated cost of the reservation (instead of being zero). This helps you know the monetary value of reservation consumption by a subscription, resource group or a resource, and can help you charge back for the reservation utilization internally. The dataset also has unused reservation hours. The dataset does not have reservation purchase records.

Comparison of two data sets:

Data	Actual Cost data set	Amortized Cost data set
Reservation purchases	Available in this view. To get this data filter on ChargeType = "Purchase". Refer to ReservationID or ReservationName to know which reservation the charge is for.	Not applicable to this view. Purchase costs aren't provided in amortized data.
EffectivePrice	The value is zero for usage that gets reservation discount.	The value is per-hour prorated cost of the reservation for usage that has the reservation discount.
Unused reservation (Provides the number of hours the reservation wasn't used in a day and the monetary value of the waste)	Not applicable in this view.	Available in this view. To get this data, filter on ChargeType = "UnusedReservation". Refer to ReservationID or ReservationName to know which reservation was underutilized. This is how much of the reservation was wasted in for the day.
UnitPrice(Price of the resource from your price sheet)	Available	Available

REFERENCE – ENTERPRISE AGREEMENT AND MICROSOFT CUSTOMER AGREEMENT RESERVATION COSTS AND USAGE
https://docs.microsoft.com/en-us/azure/cost-management-billing/reservations/understand-reserved-instance-usage-ea

5) Review Azure Tags

The following Azure Tags are configured in the template

1) Application (e.g. SAP)
2) Component (e.g. SAP ECC)
3) Cost Center
4) Environment (e.g. Prod, Non Prod, UAT, Sandbox)
5) Project (Used for Side-by-Side Project Cost Comparison)
6) Databricks (Note: The Databricks Tag is not currently used in the [API v2 – Usage] script

It is recommended to partner with your Microsoft Cloud Solution Architect (CSA) to model appropriate Azure tags required for your organization's financial reporting processes.

6) Review each Report Tab and visuals against Cost Management and Reporting Requirements

1) Daily Usage
2) Monthly Usage
3) Application Usage
4) Meter Category
5) Cost Trend
6) Project Comparison
7) Reservations
8) Capacity
9) Licensing and AHUB Benefits
10) Price Sheet

Template Data Sources

The Contoso Template includes the following data sources –

1) Measures (DAX)
    a. Capacity Measures
    b. Financial Measures
    c. Formatting Measures

2) API v2 – These are data sources from the Cost Management Connector for Power BI (Current)
3) API v1 – This the Summary Table from the depreciated Consumption Insights
4) Date Dimension
5) Metadata

All measures and data sources should be customized based on your company's cost management requirements and policies.

Template Limits

This template is developed with Power BI Desktop. If you publish your reports online, please check the limits of Power BI Desktop. The default app workspace is limited to 10GB of data. Depending on the size of your Azure Enrollment, your dataset may be larger than the 10GB limit.

For larger datasets, you can use Power BI Premium capacity to get up to 100GB of data store

REFERENCE - FOR STORAGE CAPACITY LIMITS, PLEASE REFER TO MANAGE DATA STORAGE IN POWER BI WORKSPACES
https://docs.microsoft.com/en-us/power-bi/admin/service-admin-manage-your-data-storage-in-power-bi

REFERENCE – POWER BI PRICING MODELS
https://powerbi.microsoft.com/en-us/pricing/

Azure Cost Management Resources

MICROSOFT COST MANAGEMENT
https://azure.microsoft.com/en-us/services/cost-management/?azure-portal=true

AZURE COST MANAGEMENT AND BILLING DOCUMENTATION
https://aka.ms/CostMgmt/Docs

AZURE COST MANAGEMENT VIDEO CHANNEL
https://aka.ms/CostMgmt/Video

AZURE COST MANAGEMENT UPDATES
https://aka.ms/CostMgmt/Blog

Questions

If you have questions on the template, please open an issue on the GitHub site
rowilson/azure-cost-management-pbit: Azure Cost Management Power BI Template (github.com)

Email Questions to **Rob Wilson** rowilson@microsoft.com.