

# UNDERSTANDING COSTS OF YOUR DATA ESTATE WITH POWER BI

Power BI Fest – November 20<sup>th</sup> 2021

Felix Möller

# MOTIVATION

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Understanding the cost is  
the first step to reduce them

- Complex data solutions have many different services
- Governance requires Cost Reporting
- Teams shall understand the cost that they are responsible for

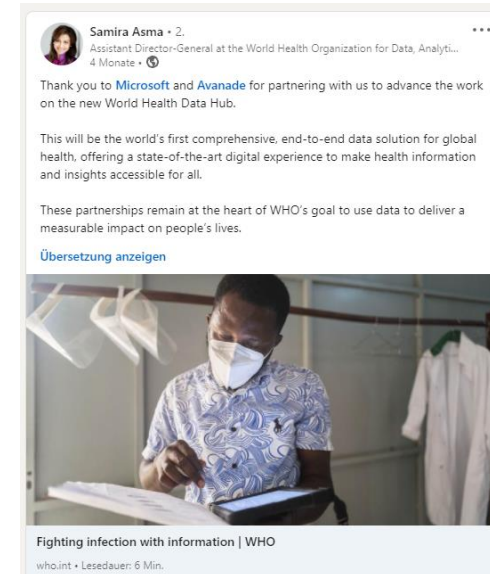
# AGENDA

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Azure Cost Extraction	6
Cost Analysis in Power BI	12
Learnings about Costs	20
Questions	23

# ABOUT ME

- **Felix Möller**
- Senior Azure Analytics Architect at Avanade – joint venture of Microsoft and Accenture.
- Built data platform at thyssenkrupp. Currently Building an Azure data platform at WHO.
- Building data warehouses with a focus on financial data and SAP for more than 9 years. Focus shifted to Data Platforms on Azure.
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- E-Mail: [f.moeller@avanade.com](mailto:f.moeller@avanade.com)



<https://www.who.int/news-room/feature-stories/detail/fighting-infection-with-information>



<https://news.microsoft.com/transform/thyssenkrupp-materials-services-keeps-calm-and-carries-on/>

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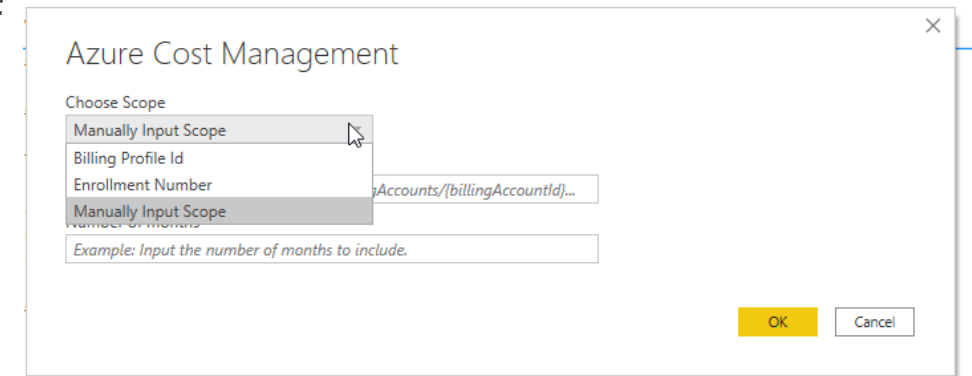
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# DIFFERENT OPTIONS OF GETTING THE COSTS

**Note:**  
There is many ways to get costs and some of them are buggy.

- Power BI: Azure Cost Management Data Source
  - Requires access to the billing account
- Azure Portal
  - unbearable slow
- Azure Portal Cost Export
  - Has be configured manually
  - schema is determined during creation
- Azure Cost Export API
  - az costmanagement – creates locale dependent headers
  - az rest – results in an internal server error (see [GitHub Issue #18864](#))
  - Invoke-WebRequest – works 😊



# THE COST API HAS SOME LIMITATIONS

**Note:**  
Behind the scenes  
access key is leveraged  
to store data in the  
storage account.

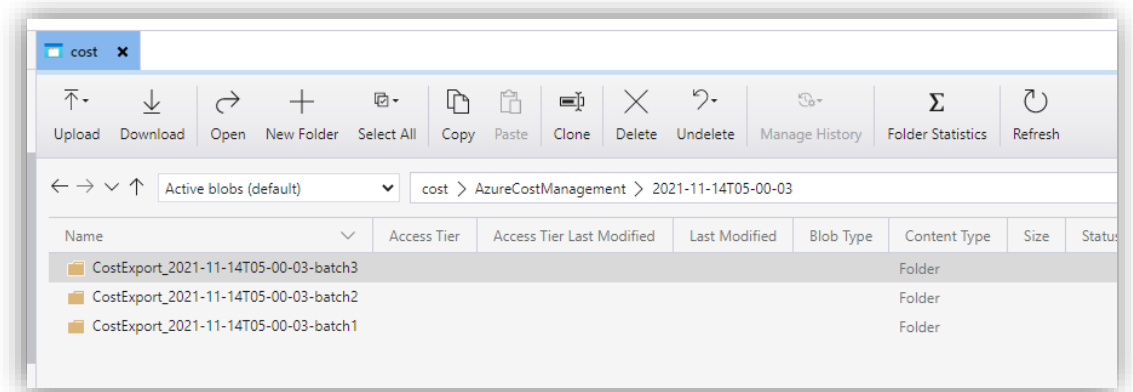
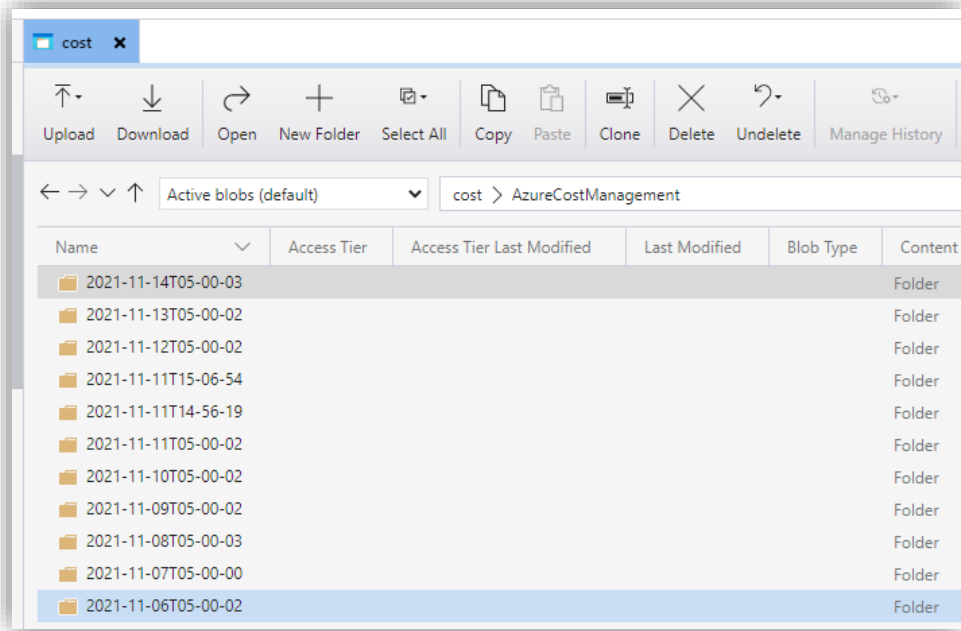
- Exports are not immediately executed, they are just triggered
- It takes time for costs to be available in the cost management
- I have given up on getting a delta
- I create full snapshots every day
- One can only export 3 months at a time  
→ use batching
- Behind the scenes key access is used for the storage account

```
74 Write-Output "Filtered subscriptions: $subscriptions"
75
76 foreach ($batch in 1..[math]::ceiling($monthsBackTotal / $batchSize)) {
77     foreach ($scopeSubscriptionId in $subscriptions) {
78         $exportName = "CostExport_$scopeSubscriptionId_$exportTimeStamp-batch$batch" -replace '\.', '_'
79         $startOffset = -[math]::min($batch * 2, $monthsBackTotal)
80         $endOffset = -($batch-1) * 2
81         $exportPeriodStart = [DateTime]::Today.AddMonths($startOffset).ToString("yyyy-MM-ddTHH:mm:ss")
82         $exportPeriodEnd = [DateTime]::Today.AddMonths($endOffset).ToString("yyyy-MM-ddTHH:mm:ss")
83         Write-Output "Start $exportPeriodStart to $exportPeriodEnd"
84         $body = @"
85 {
86     "properties": {
87         "format": "Csv",
88         "deliveryInfo": {
89             "destination": {
90                 "resourceId": "/subscriptions/$storageAccountSubscriptionId/resourceGroups/$storageAccount
91                 "container": "$storageAccountContainer",
92                 "rootFolderPath": "$storageAccountRootDirectory/$exportTimeStamp"
93             }
94         },
95         "definition": {
96             "type": "ActualCost",
97             "timeframe": "Custom",
98             "timePeriod": {
99                 "from": "$exportPeriodStart"
```

Full script at <https://azdataguy.com/blog/azurecostmonitoring>

# DEMO: EXPORT

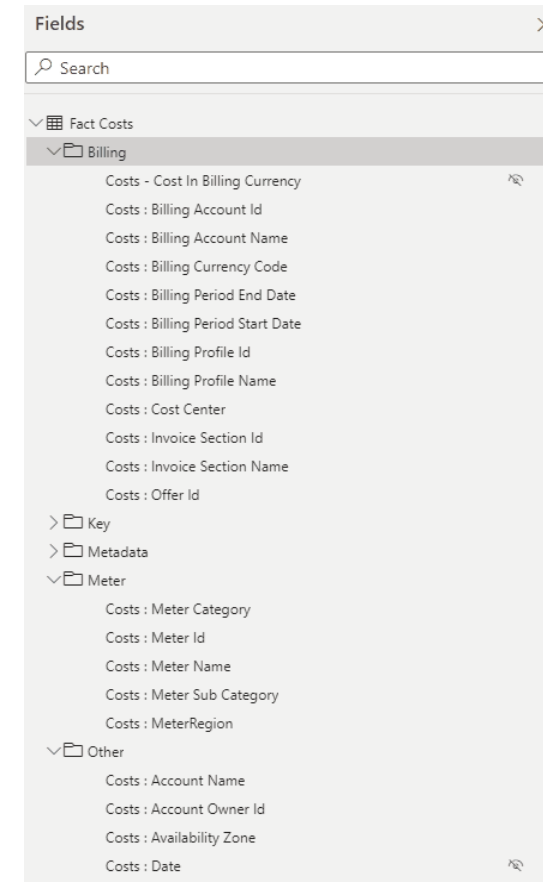
- New Snapshots every day
- All batches separated integrated in Power BI





# ... BUT IT PROVIDES A GREAT LEVEL OF DETAIL

- Detailed information on the sources of cost (resource name + details)
- But also on applicable pricing model, quantity consumed, etc.



# SCOPE OF COST API EXTRACTS

- Cost API extracts contain data at subscription level
- Multi-subscription projects will have to run the extraction multiple times, possibly using different service connections

Scheduled by 'Mornings'

View 4 changes

Repository and version  
📁 development 📄 cce081c6

Time started and elapsed  
📅 Today at 5:00 AM  
⌚ 4m 51s

Related  
📁 5 work items  
📁 0 artifacts

Tests and coverage  
[Get started](#)

Jobs

Name	Status	Duration
✅ ONBOARDING environment cost export	Success	⌚ 3m 51s
✅ DEV environment cost export	Success	⌚ 2m 21s
✅ TEST environment cost export	Success	⌚ 2m 24s
✅ PROD environment cost export	Success	⌚ 1m 49s









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# NAMING CONVENTIONS
















- Very important to have naming conventions
- All resource groups follow naming convention
- All resources follow naming convention
  - <project><env><region><team><resource type>
- All resources are deployed via Azure DevOps
- We allow custom Tags to be added to all resources provisioned by a team

<input type="checkbox"/>	Name ↑↓
<input type="checkbox"/>	 srhdteuwdevteamdf
<input type="checkbox"/>	 srhdteuwdevteamkv
<input type="checkbox"/>	 srhdteuwdevteamkv-pe
<input type="checkbox"/>	 srhdteuwdevteamkv-pe.nic.054df8ee-52de-4447-95d8-f838d8a56802
<input type="checkbox"/>	 srhdteuwdevteamml
<input type="checkbox"/>	 srhdteuwdevteammlsa
<input type="checkbox"/>	 srhdteuwdevteamsyn
<input type="checkbox"/>	 srhdteuwdevteamsynsa

# NAMING CONVENTIONS

- Standard:
- <project><env><region><team><resourcetype>
- Dependent resources:
- <base\_resource><resourcetype>

<input type="checkbox"/>		srhdteuwdevteamdf
<input type="checkbox"/>		srhdteuwdevteamkv
<input type="checkbox"/>		srhdteuwdevteamkv-pe
<input type="checkbox"/>		srhdteuwdevteamkv-pe.nic.054df8ee-52de-4447-95d8-f838d8a56802
<input type="checkbox"/>		srhdteuwdevteamml
<input type="checkbox"/>		srhdteuwdevteammlsa
<input type="checkbox"/>		srhdteuwdevteamsyn
<input type="checkbox"/>		srhdteuwdevteamsynsa

<input type="checkbox"/>		srhdteuwnet
<input type="checkbox"/>		srhdteuwstdsa-events
<input type="checkbox"/>		srhdteuwstdsa
<input type="checkbox"/>		srhdteuwsa-events
<input type="checkbox"/>		srhdteuwsa
<input type="checkbox"/>		srhdteuwlog
<input type="checkbox"/>		srhdteuwaemail
<input type="checkbox"/>		srhdteuwbkv-pe.nic.cd819343-4f07-4eed-9668-37cd198957e0
<input type="checkbox"/>		srhdteuwbkv-pe
<input type="checkbox"/>		srhdteuwbkv
<input type="checkbox"/>		srhdteuwavafsa
<input type="checkbox"/>		srhdteuwavaf
<input type="checkbox"/>		srhdteuwavaci
<input type="checkbox"/>		srhdteuwai
<input type="checkbox"/>		srhdteuwacr

# TAGS

**Note:**  
ADF loses its tags  
whenever you  
deploy pipelines  
into it.

- All Azure resources can be tagged
- Tags are arbitrary key value pairs
- All resources are tagged with the pipeline that they are provisioned by

srhdteuwstdsa | Tags

Storage account

Search (Ctrl+/) << Delete all

Overview  
Activity log  
Tags  
Diagnose and solve problems  
Access Control (IAM)  
Data migration  
Events  
Storage Explorer (preview)

Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. Tag names are case insensitive, but tag values are case sensitive. [Learn more about tags](#)

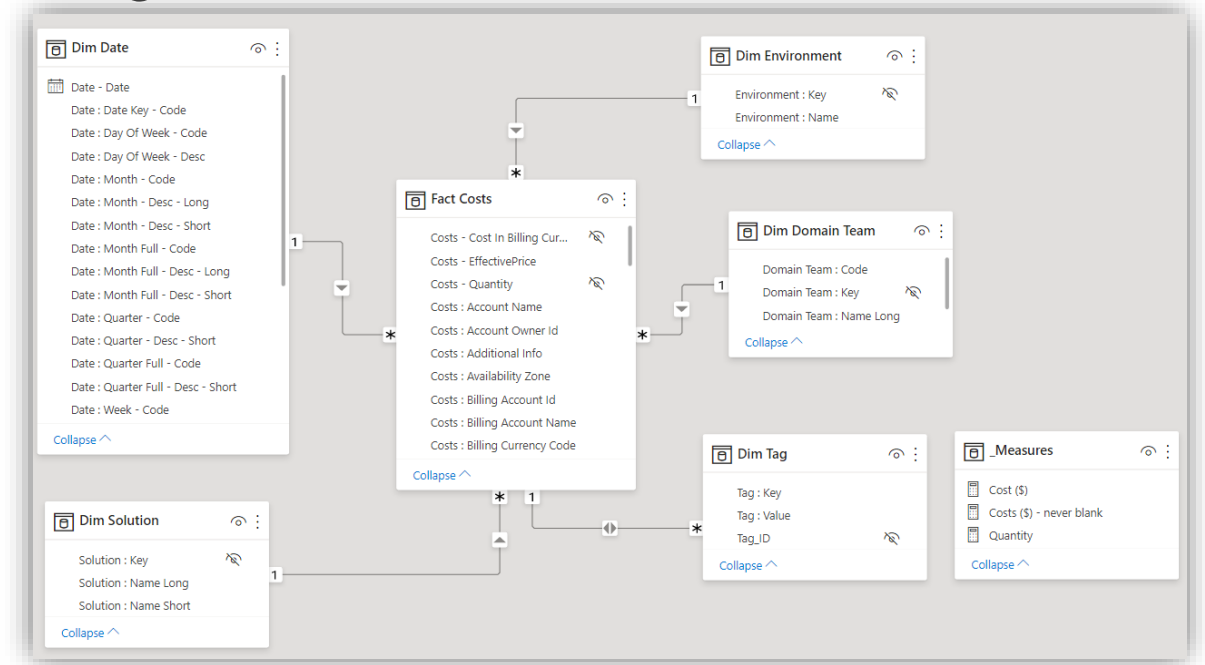
Do not enter names or values that could make your resources less secure or that contain personal/sensitive information because tag data will be replicated globally.

Name	Value	
pipelineBuildNumber	: 20210625.2	
pipelineDefinition	: Core platform infrastructure	
pipelineRequester	:	

# DATA MODEL

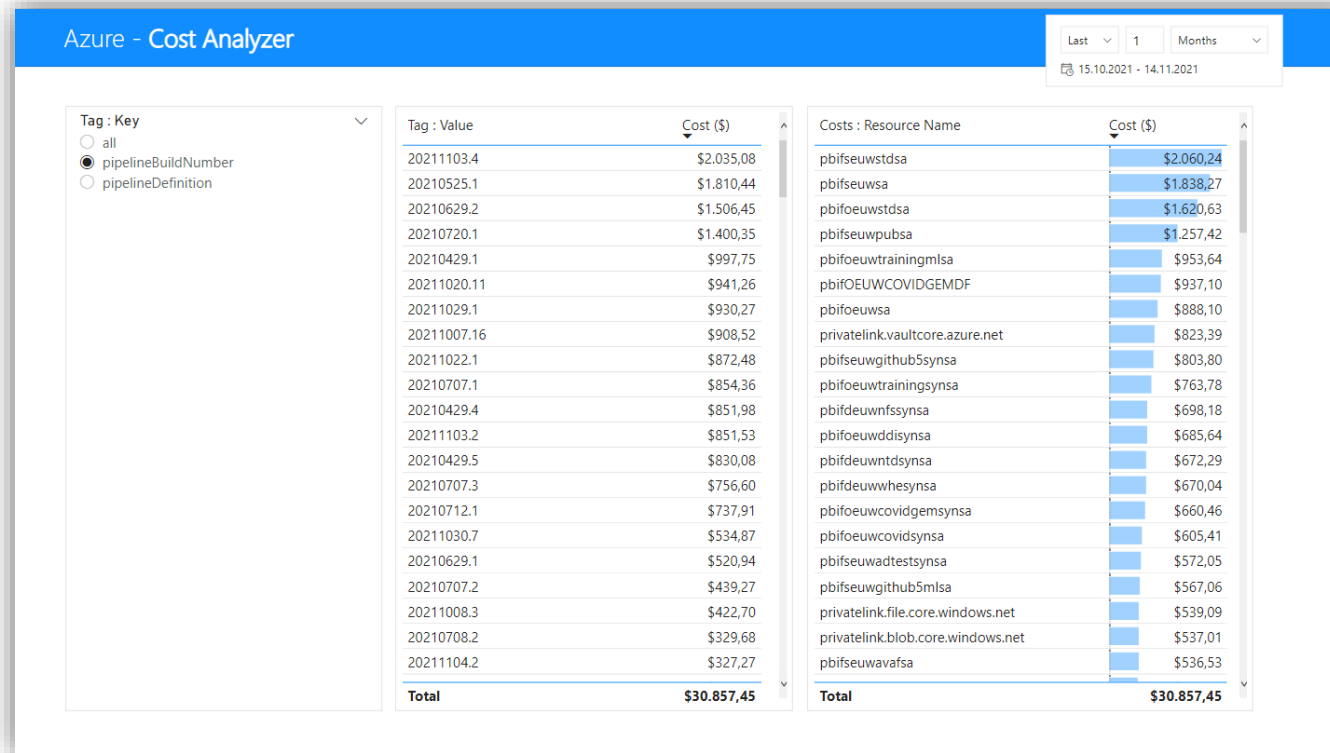
**Note:**  
Proper dimensional  
modelling should be  
done in any Power BI  
project.

- Most dimension attributes are inferred from the resource's naming conventions
- Many-to-one relationship between Dim Tags and Fact Costs
- RLS allows you to give cost access to all team on the platform



# DATA MODEL

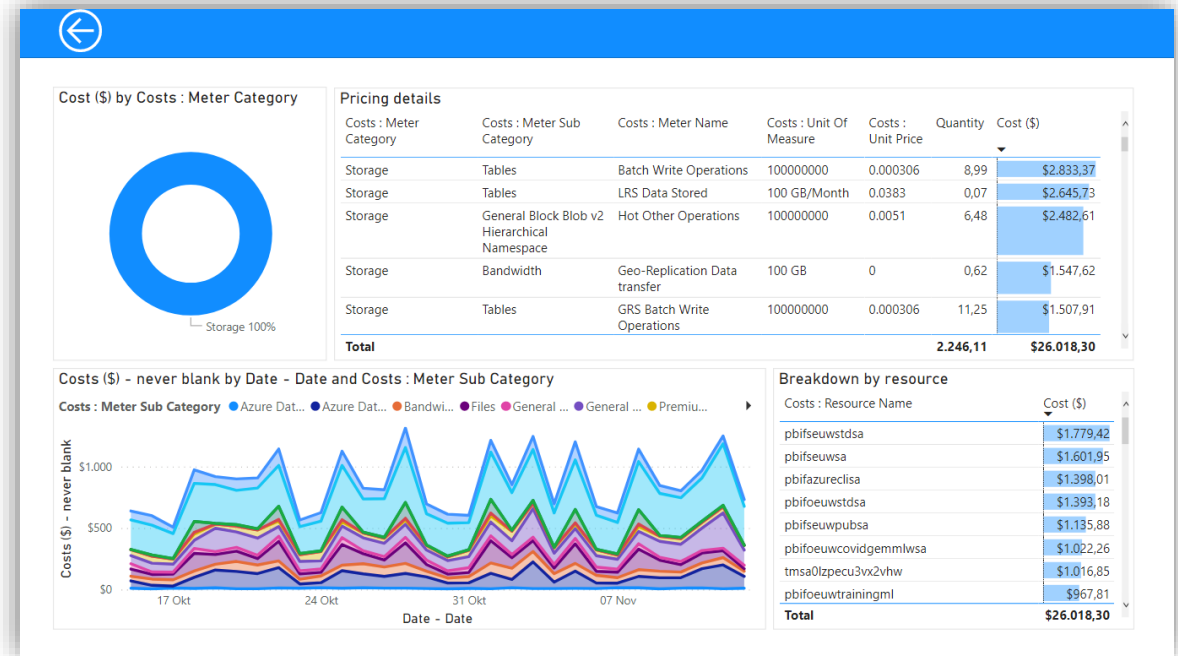
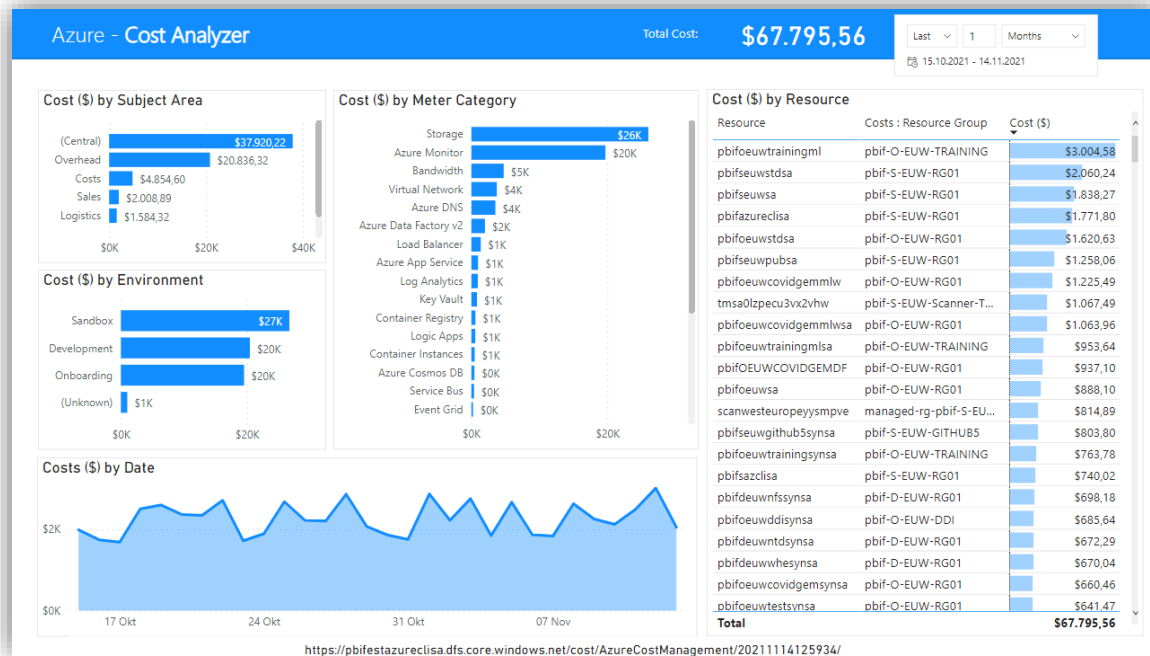
## ARBITRARY TAGS AS DIMENSION ATTRIBUTES



**Note:** As on all slides the cost information is not real data.



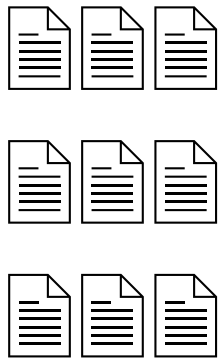
# LEVERAGING QUANTITY AND PRICING INFORMATION



**Note:** As on all slides the cost information is not real data.

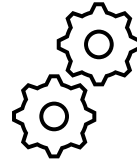
# UPDATING THE REPORT WITH LATEST DATA

Data Lake Folder



automatic

Power Query



Detect latest folder and filter on it

Power BI Dashboard



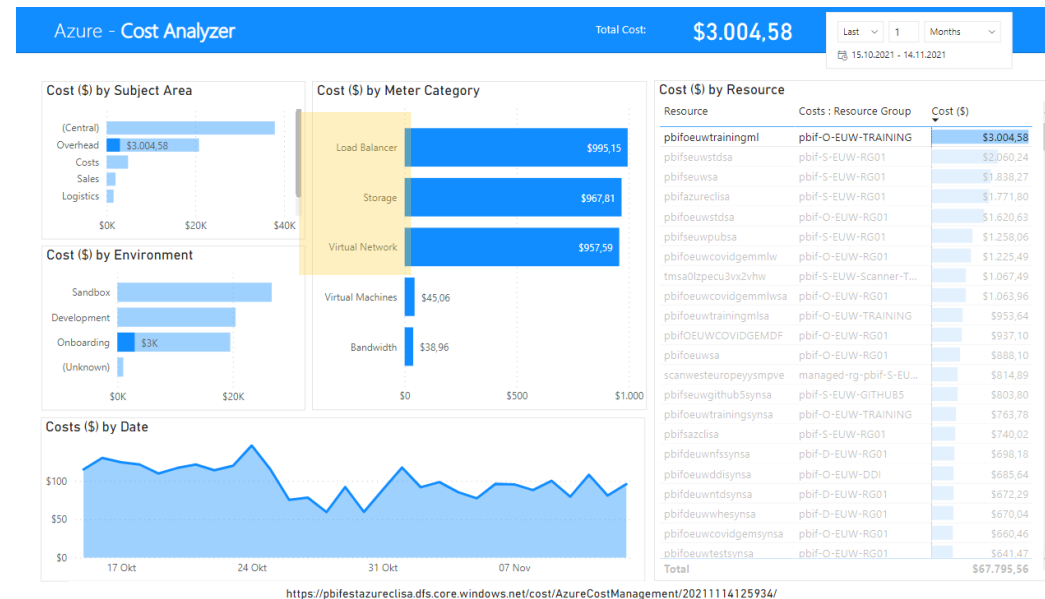
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# LEARNINGS: THERE IS LOTS OF HIDDEN COSTS

- Remember that there is lots of hidden costs
  - Azure ML for example does not cost anything by itself, but several child resources are created



Note: As on all slides the cost information is not real data.

# LEARNINGS: INVESTIGATING COSTS SAVES MONEY!

- Understanding cost in detail helps to reduce costs
- Resources are easily created, should be monitored for deletion
- The unexpected costs are the most relevant to catch
- Naming conventions are a prerequisite
- Power BI gives a lot more options compared to the Azure Portal
- Cost Reporting is not just a technical challenge you need a governance process with regular meetings
- Empower your users to see their own costs

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# QUESTIONS

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# THANKS FOR YOUR ATTENTION

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- See you at <https://azdataguy.com/>
- For the script have a look at <https://azdataguy.com/blog/azurecostmonitoring>