Fabric Monitoring Made Simple

Built-In Tools and Custom Solutions

17th edition
SQLDay Conference

12-14 May 2025, WROCŁAW + ONLINE

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- **Principal Architect at twoday**
  - Pre-sales, workshops, events, marketing
  - Internal practice development
  - Academy: External training
- **Microsoft Data Platform MVP**
- **Found and organizer of**
  - Danish Microsoft BI Community (MsBIP.dk)
  - Power BI UG Denmark (PowerBI.dk)
  - Data Platform Next Step, Power BI Next Step and Power BI Cruise

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Slides

Agenda

1. Why monitor?
2. Out of the box solutions
3. Community tools
4. Build your own solution

Why monitor?

Overview of Monitoring in Fabric

- **Operational efficiency:**
  - Track performance of reports, queries, compute usage, and pipelines.
  - Monitor system health and ensure uptime.
  - Adoption of Fabric
- **Security and Compliance:**
  - Audit access, roles, and permissions.
  - Monitor security events for regulatory compliance (GDPR, SOC).
- **Data Quality:**
  - Validate data throughout transformation processes.
  - Detect and address inconsistencies proactively.
- **Cost:**
  - Monitor workload usage and optimize resources.
  - Set alerts for cost overruns and resource efficiency.

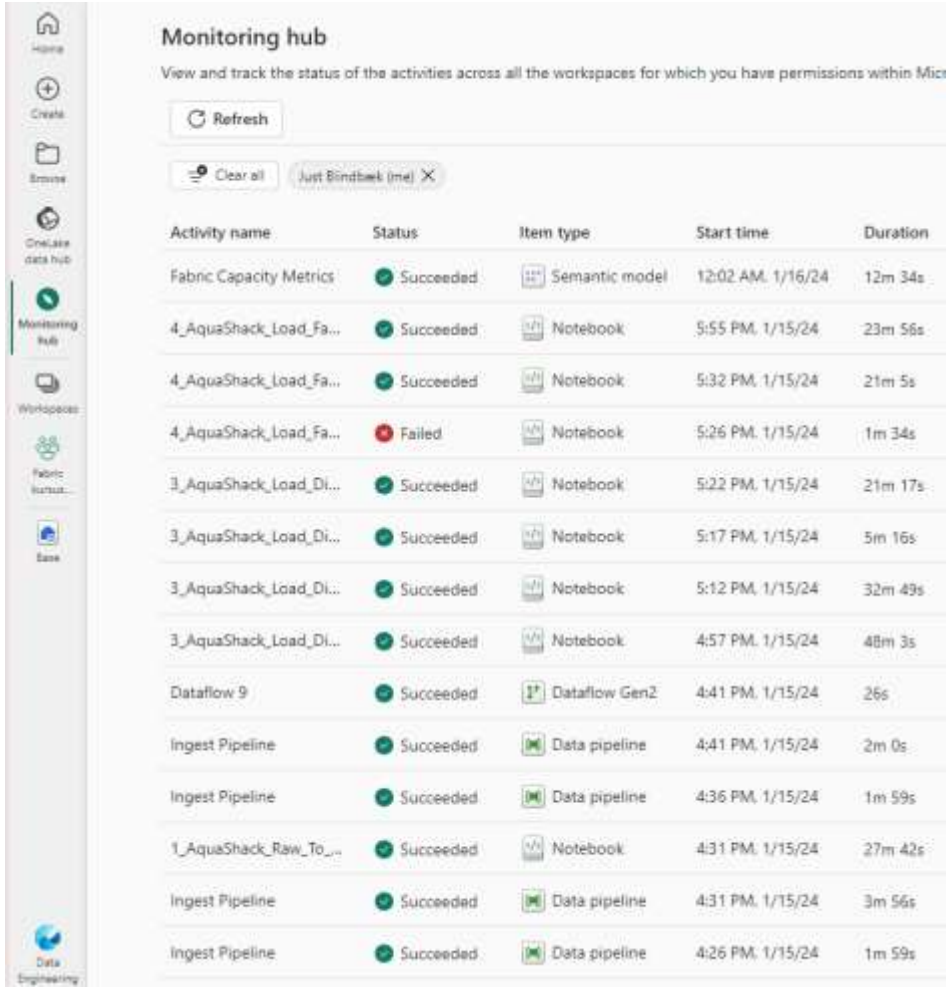
Out of the box solutions

1. Monitoring (hub)
2. Admin Monitoring Workspace
3. Workspace Monitoring
4. Capacity Metrics App

Monitoring (hub)

Monitoring (hub)

- Monitor various Microsoft Fabric activities, such as semantic model refresh and Spark Job runs
- Is available for workloads from Power BI, Data Factory, Data Engineering and Data Science
- Filters are applied by default to limit the number of items initially displayed
- Select different filters by using the filter drop-down in the upper right corner
- Select an item from the list and get detailed information about that item
- Hover over an item's name and get available quick actions for the item, such as stop, start, re-run, or other quick actions



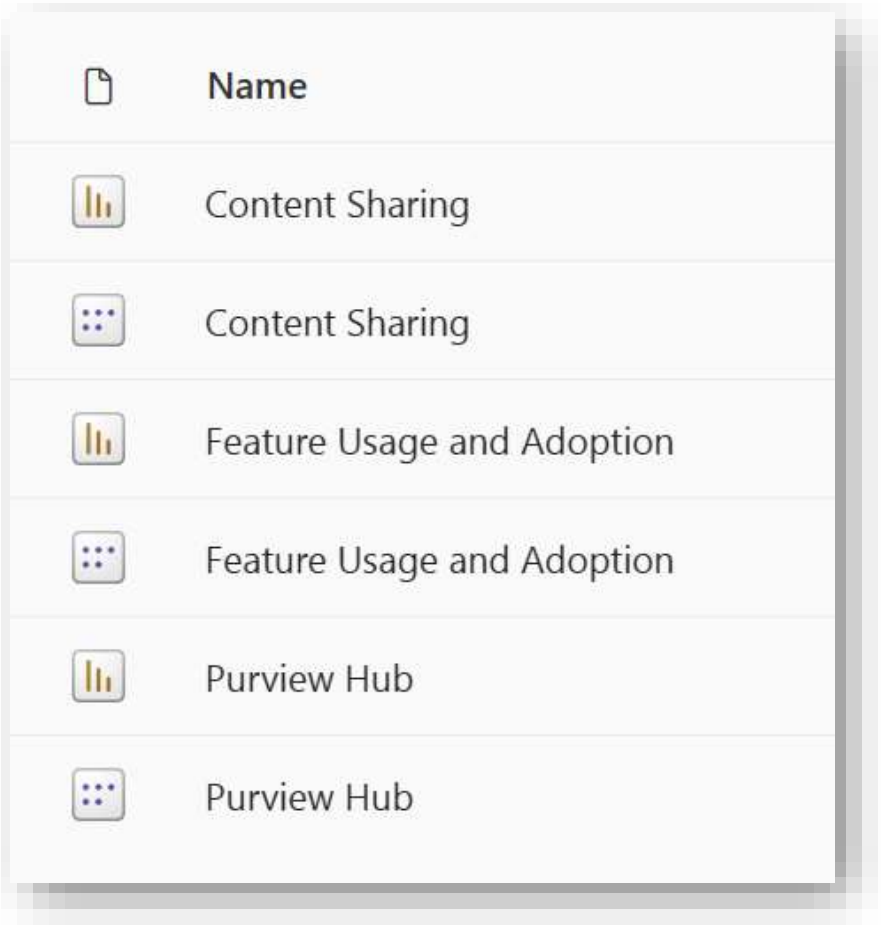
https://learn.microsoft.com/en-us/fabric/admin/monitoring-hub

Admin Monitoring Workspace

Insights in One Place

Admin Monitoring Workspace - Insights in One Place

- One-stop shop for enterprise reporting and analytics
- Data queried from multiple sources, transformed, and landed in a single repository specific to each tenant
- Includes out of the box reporting focused on Fabric tenant management scenarios
- Also includes semantic models for customization
  - Out of the box reporting and curated semantic models made readily available via the workspace
  - Managed, automated data refresh of all semantic models
- Available to all tenants regardless of licensing type or total # of users
- Only retains information for 28 day



https://learn.microsoft.com/en-us/fabric/admin/monitoring-workspace

Feature usage and adoption report

- Leverages audit data (previously only available via the Activity Events API) for conducting audits and understanding how various Fabric features are utilized across your tenant.
- Audit and inventory-focused
  - Understand what activities are occurring in your tenant, by whom, on which item, and where
  - Audit combined with tenant inventory for understanding your most heavily-utilized and ‘dormant’ items
  - Analyze custom scenarios via drill through pages and flexible visuals (e.g. decomp tree)

https://learn.microsoft.com/en-us/fabric/admin/feature-usage-adoption

Content sharing report (preview)

- Understand how Fabric items are distributed and shared across the organization:
  - Is my organization effectively using domains to organize its Fabric inventory?
  - Most shared items by total access count
  - Item distribution by endorsement and sensitivity label
  - Items shared with the entire organization using links
  - Item deleted within the last 28 days

https://learn.microsoft.com/en-us/fabric/admin/content-sharing

Workspace Monitoring

Workspace Monitoring

- **Built-in solution** for root-cause analysis, historical log analysis, and anomaly detection.
- Simplifies access to diagnostic logs and metrics.
- Leverages Eventhouse (KQL database) for efficient, self-serve troubleshooting and diagnostics.
- Provides seamless, end-to-end visibility across Fabric native data apps.
- Correlates events from origination to subsequent operations and queries across services.

- **Workspace-level enablement:**
  - Send diagnostics to an Eventhouse for analysis.
  - Access pre-built reports, dashboards and Querysets for quick insights.
  - Raw data available for custom dashboards, insights, and alerts.

https://learn.microsoft.com/en-us/fabric/fundamentals/workspace-monitoring-overview

Scope of Platform Monitoring

- Power BI
  - Semantic Models Queries
  - Semantic Models Refreshes
- Real-Time Intelligence
  - Eventhouse Queries
  - Eventhouse Metrics
- GraphQL
- Mirrored database

- Planned:
  - Spark
  - Pipelines
  - SQL
  - Capacity data

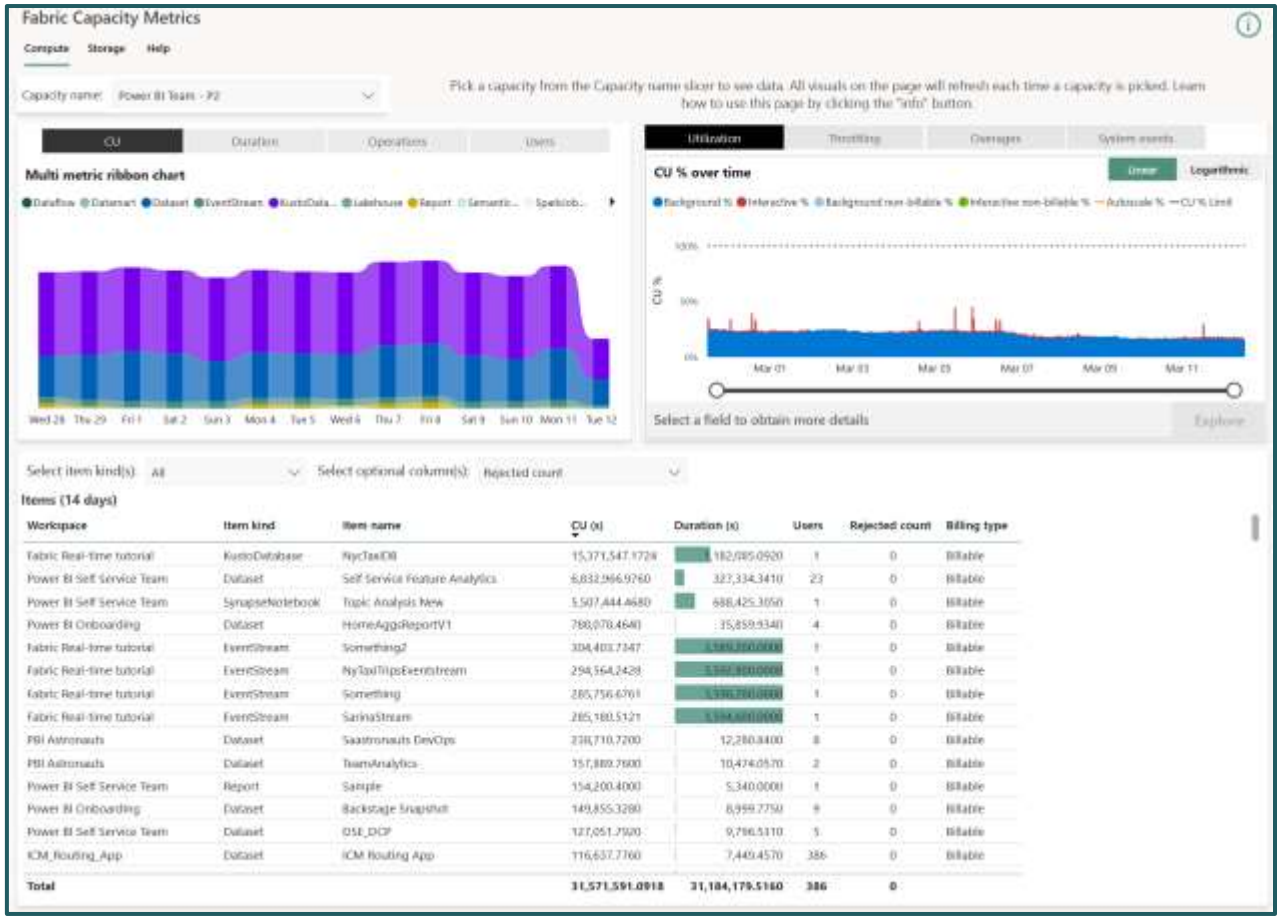
```
// log count per day for last 30d
SemanticModelLogs
| where Timestamp > ago(30d)
| summarize count() by format_datetime(Timestamp, 'yyyy-MM-dd')

// average query duration by day for last 30d
SemanticModelLogs
| where Timestamp > ago(30d)
| where OperationName == 'QueryEnd'
| summarize avg(DurationMs) by format_datetime(Timestamp, 'yyyy-MM-dd')
```

```
//Succeeded vs Failed Queries over time in past 30 days Linechart
let Duration =timespan(30);
EventhouseQueryLogs
| where Timestamp  > ago (Duration)
| where Status in("Failed" , "Throttled")
|summarize Count=count() by Status,  bin(Timestamp, 1d)
|render linechart
```

Capacity Metrics App

Capacity Metrics App

- Gain tenant-wide visibility into capacity usage across all Fabric workloads.
- Identify resource usage trends to optimize autoscale and mitigate throttling impacts.
- Compare preview and production workloads for data-driven capacity sizing decisions.
- Zoom in on workload operations and artifacts with detailed granularity down to 30 seconds.
- Monitor real-time operations and the impact of long-running jobs on capacity limits.
- Analyze user experience to plan efficient scale-ups and optimize resource allocation.



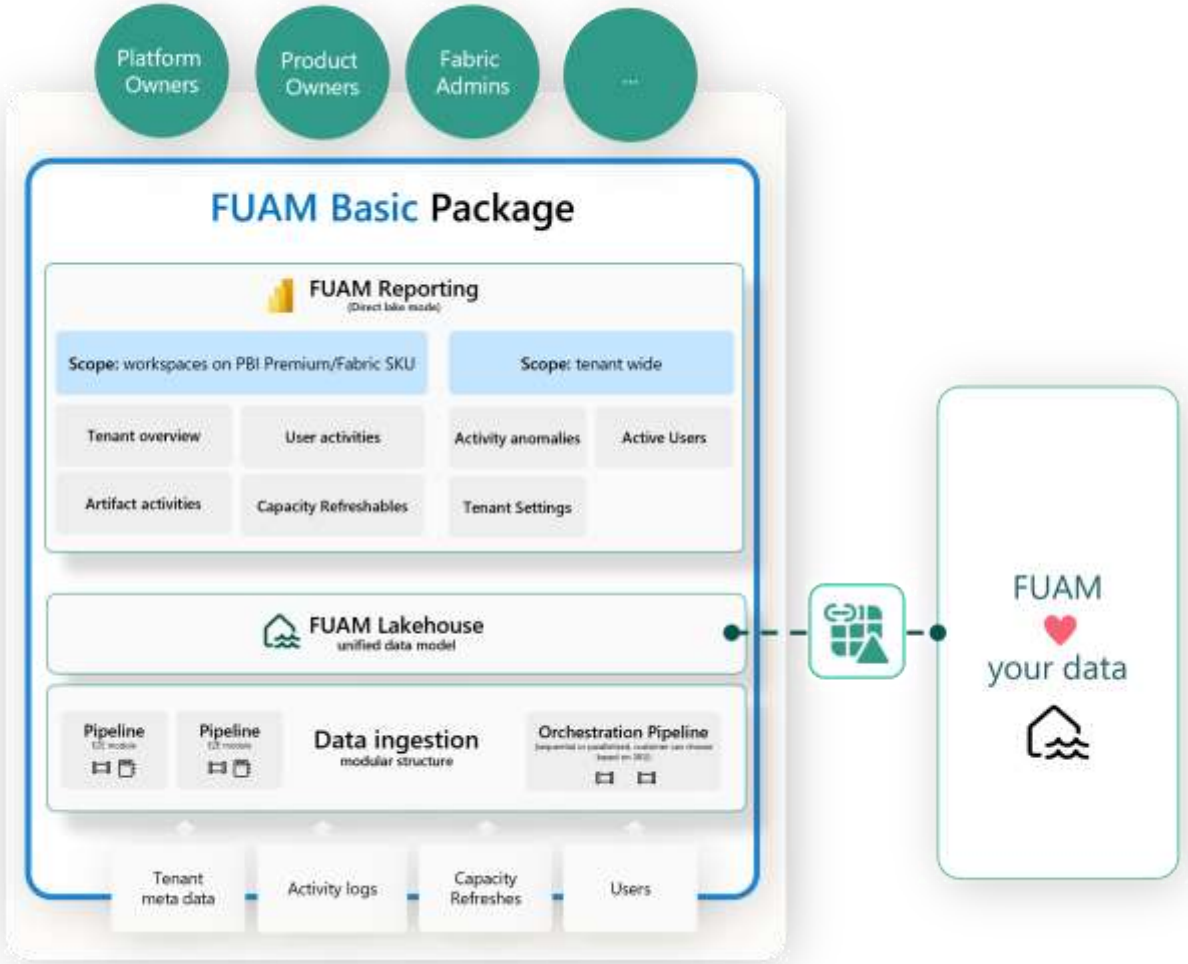
https://learn.microsoft.com/en-us/fabric/enterprise/metrics-app

Community Tools

1. Fabric Unified Admin Monitoring (FUAM)

Fabric Unified Admin Monitoring (FUAM)

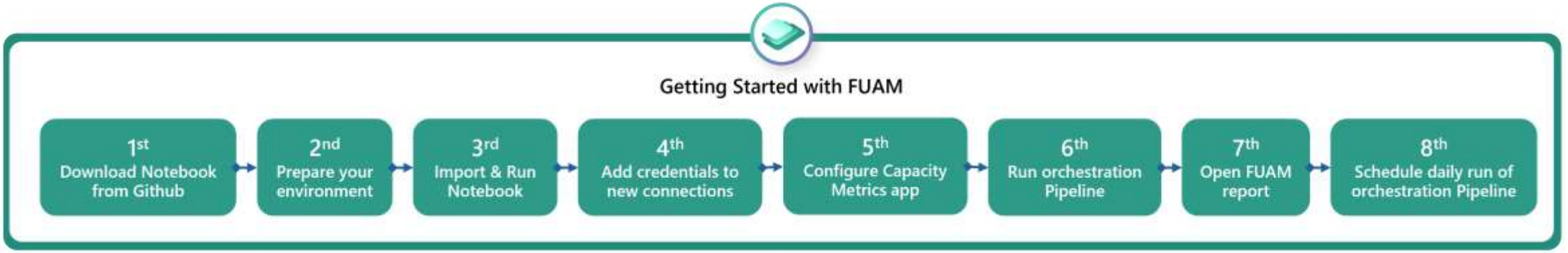
- A solution designed to deliver holistic monitoring across Fabric.
- Fully built using Microsoft Fabric tools, leveraging Data Pipelines and Notebooks to extract and transform monitoring data.
- Provides a unified view of various telemetry sources, enabling both high-level overviews and granular deep dives into specific artifacts.



Fabric Unified Admin Monitoring (FUAM)

- Supports monitoring of:
  - Tenant Settings, Delegated Tenant Settings, Activities, Workspaces, Capacities, Tenant meta data (Scanner API), Capacity Refreshables and Git Connection

- Set up FUAM step by step via Notebook.



https://github.com/microsoft/fabric-toolbox/tree/main/monitoring/fabric-unified-admin-monitoring

Build your own solution

1. Tenant Monitoring
2. Job Monitoring
3. Capacity Monitoring

Tenant Monitoring

Build your own solution

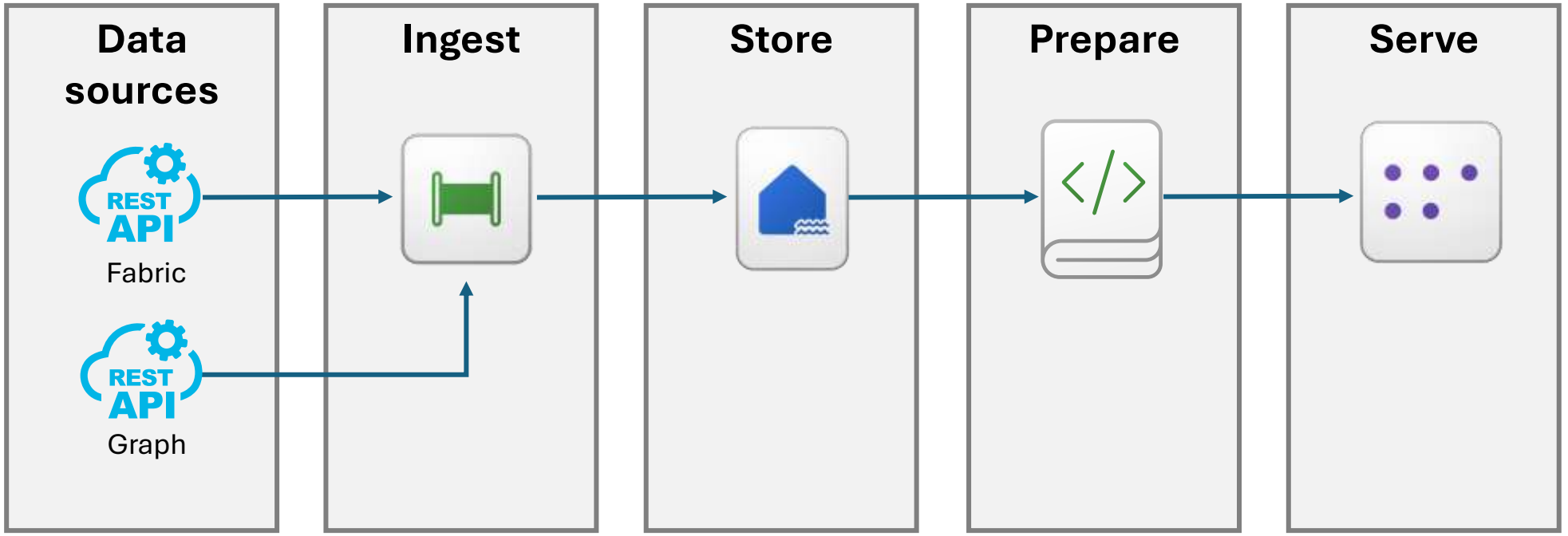
A complete solution to ingest and prepare

- Fabric activity/audit events
- Fabric artifacts metadata – the tenant catalogue
- Fabric tenant settings
- Extra: Microsoft Graph data (users, groups, licenses)

- Coming soon: Templates to download and get you started

https://github.com/justBlindbaek/PowerBIMonitor

Dataflow architecture



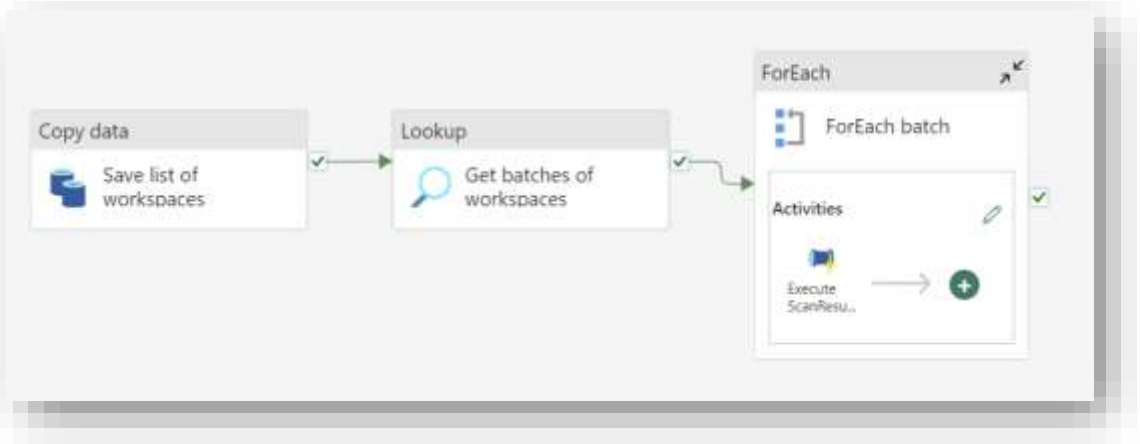
Access to the data: pre-req setup

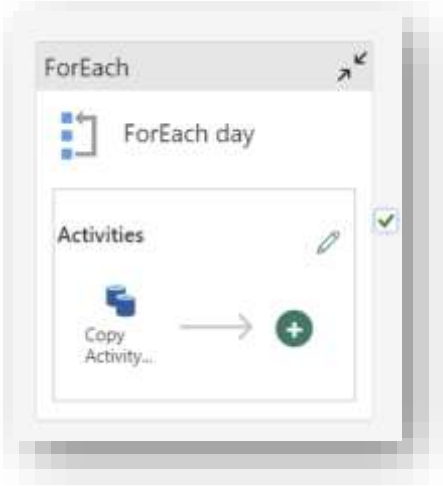
- Create a Service Principal (App Registration)
- Create a new Security Group in Azure Active Directory
- Add the Service Principal as a member of the security group
- Enable service principal authentication for read-only admin APIs in Admin Tenant Settings and add the security group
- Optional: Enable the Enhance admin APIs responses with “detailed metadata” and ”DAX and mashup expressions”

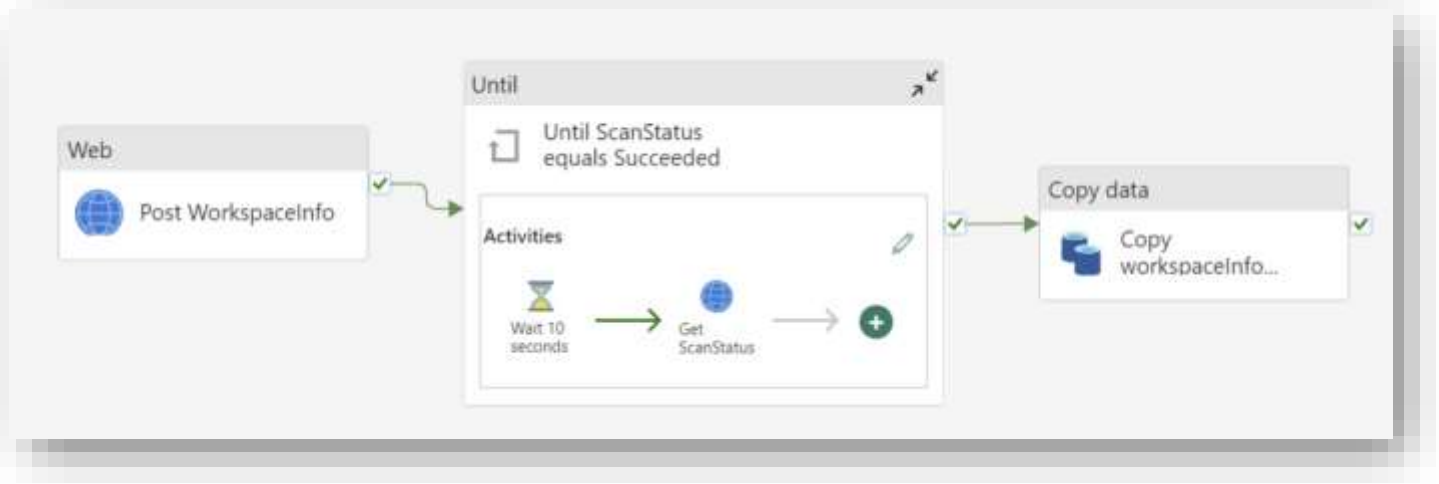
https://justb.dk/blog/2021/02/extracting-the-power-bi-activity-log-with-data-factory/

Ingest with Data Factory Pipelines

Name	Type
PL_FabricGetTenantSettings	Data pipeline
PL_PowerBIGetActivityEvents	Data pipeline
PL_PowerBIWorkspaceInfo	Data pipeline
PL_PowerBIWorkspaceInfoScanResult	Data pipeline







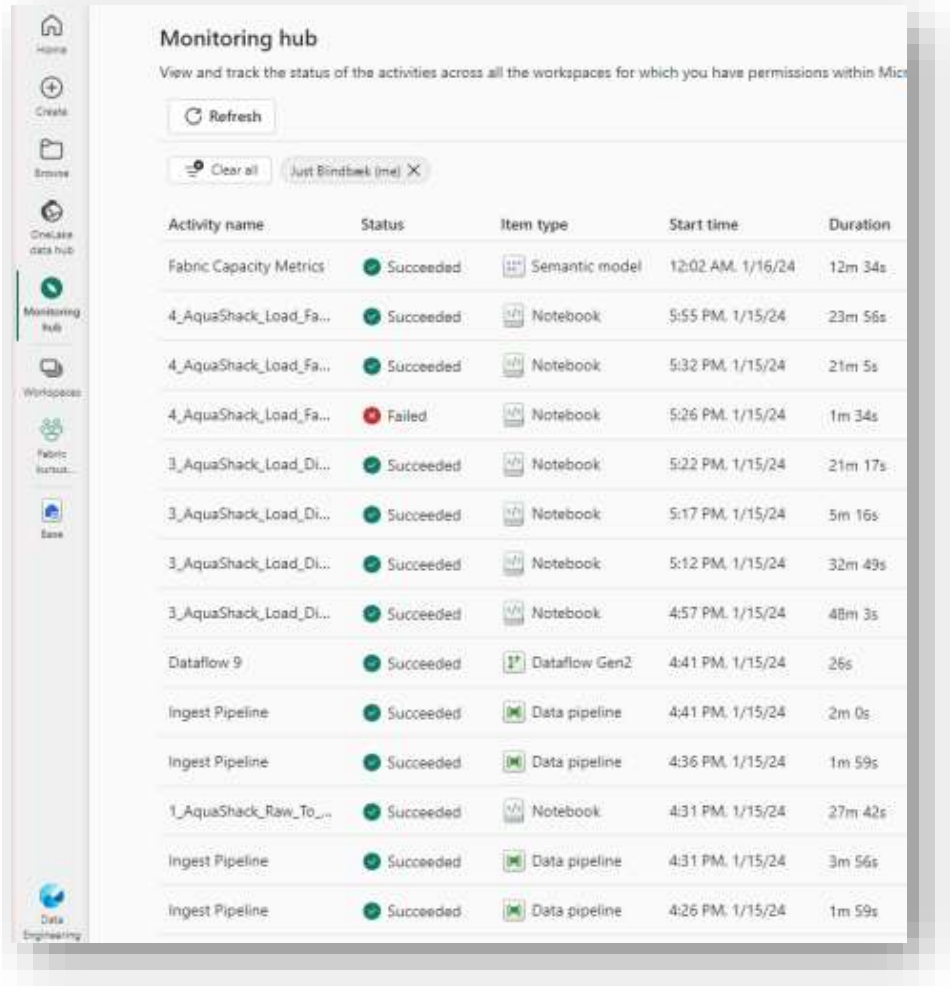
Job Monitoring

Build your own solution

Job Monitoring

- Built-in monitoring hub is very limited
- No reports and dashboards
- No pro-active alerts

- But then what?



Job Events in Real-Time Hub

- Subscribe to changes produced when Fabric runs a job
  - React to changes when refreshing a semantic model, running a scheduled pipeline, or running a notebook.
  - Each of these activities can generate a corresponding job, which in turn generates a set of corresponding job events.
- Monitor job results in time and set up alerts using Data Activator alerting capabilities
  - When the scheduler triggers a new job, or a job fails, you can receive an email alert.
  - Even if you aren't in front of the computer, you can still get the information you care about.

https://learn.microsoft.com/en-us/fabric/real-time-hub/explore-fabric-job-events

Capacity Monitoring

Build your own solution

Modify the Capacity Metrics App to meet your needs

- Build a custom report off the semantic model
- Send DAX queries to the metrics app semantic model in your own solution
  - Power Automate, Notebook (SemPy), PowerShell, etc.
  - Get throttling % values (Interactive Delay, Interactive Rejection, and/or Background Rejection)
  - Latest values and/or trends over time
  - Best for summarized data only (e.g., hour, day)
- Incorporate Metrics App queries into custom solutions

```
# Get max date from current delta table (to avoid loading duplicate days)
try:
    df_max = spark.sql(f'''
    SELECT MAX(Date) as MaxDate
    FROM throttling;
    '''
    )
    maxdate = df_max.first()['MaxDate']
except:
    maxdate = datetime.today() + timedelta(days=-6)
maxdateforDAX = maxdate.strftime('%Y,%m,%d')

if maxdate.date() < (datetime.today() + timedelta(days=-1)).date():

    # Get data for each capacity, write daily csv and append delta
    for capacity in lst_capacities:
        querytext = '''\
                    DEFINE
                    MPARAMETER 'CapacityID' = "{capID}"
                    VAR yesterday =
                        FILTER(ALL('Dates'[Date] ), 'Dates'[Date] < TODAY() && 'Dates'[Date] > DATE({MD}) )

                    EVALUATE
                    SUMMARIZECOLUMNS(
                        'Dates'[Date],
                        'TimePoints'[Start of Hour],
                        yesterday,
                        "IntDelay", ROUND( 'All Measures'[Dynamic InteractiveDelay %] * 100, 2 ),
                        "IntReject", ROUND( 'All Measures'[Dynamic InteractiveRejection %] * 100, 2 ),
                        "BackReject", ROUND( 'All Measures'[Dynamic BackgroundRejection %] * 100, 2 )
                    )
                    '''.format(capID=capacity, MD=maxdateforDAX)
        df_throttling = fabric.evaluate_dax(workspace=MetricsWS, dataset=MetricsModel, dax_string=querytext)
        if len(df_throttling) >= 1:
            df_throttling.columns = df_throttling.columns.str.replace(r'(.*\[)|(\].*)', '', regex=True)
            df_throttling.columns = df_throttling.columns.str.replace(' ', '_')
            df_throttling['capacityId'] = capacity
            filename = capacity + '_throttling_' + (datetime.today()).strftime('%Y%m%d') + '.csv'
            df_throttling.to_csv("/lakehouse/default/Files/ThrottlingData/" + filename)
            spk_throttle = spark.createDataFrame(df_throttling)
            spk_throttle.write.mode("append").format("delta").option("overwriteSchema", "true").saveAsTable('Throttling')
```

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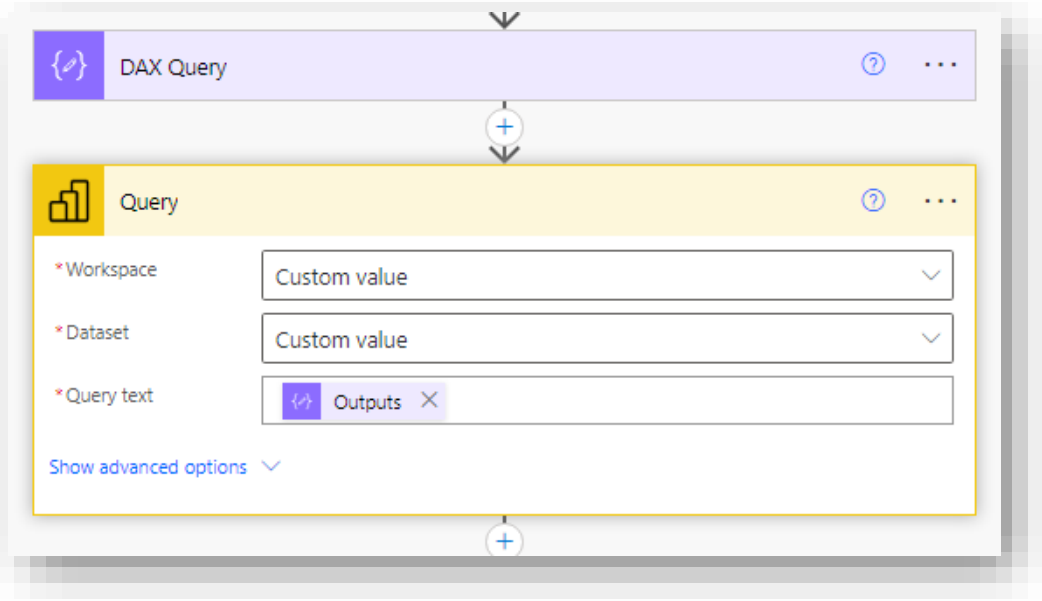

Fabric Capacity Insights

by Data Pulse

This report provides key information on your tenant Fabric: which workspace is consuming too much power? Is my capacity properly sized? With precise graphs and tables, you'll find all the information you need to effectively manage your tenant Fabric.

Select your period

Last | 30 | Days

9/4/2024 - 10/3/2024

CONSUMPTION SUMMARY

CONSUMPTION ALERTS

Capacity	SKU	Capacity utilisation	Hourly overruns	Storage (GB)
Marketing capacity	FT1	43 %	25	174K
HR capacity	F2	200 %	1	0K
IT capacity	FT1	21 %	1	134K
Finance capacity	FT1	11 %	0	2K
Global		**25 %**	**27**	**310K**

4
Active capacities

33
Workspaces
Including 38 datasets

31
Lakehouses

40
Warehouses

7
Dataflows

8
Pipelines

22
Notebooks

Last update : 03/10/2024 at 9h

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