

Licensing woes and headaches

- how to handle Power BI and Fabric



Thank you to our Fabric February Friends!



twoday

bouvet

sopra  steria



DATAmasterminds



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Agenda

Licensing in Power BI

The Fabric versions

What are the capacity limits?

What to use when?

Usage patterns

Power BI licensing

- Power BI User based licensing
- Power BI Premium
- Power BI embedded



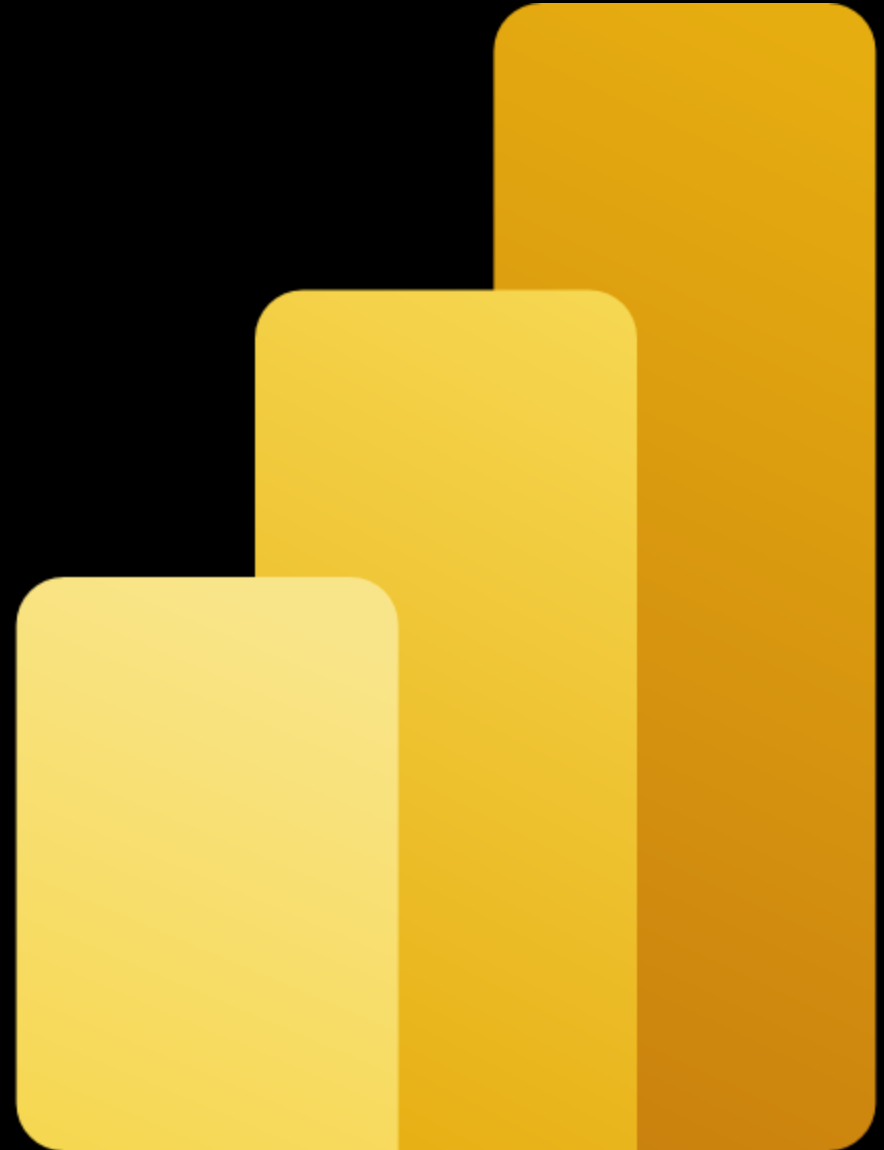


Power BI user-based licensing


- Power BI Free
 - Power BI Pro
 - Power BI Premium Per user
-
- Pro and Premium comes with access to shared capacity

Power BI Premium

- Tenant level subscription with dedicated capacity
- P scale from P1 up to P5
- P1 = 8 vCores, P5 = 128 vCores
- App users don't need a Pro license



Power BI Premium



- Tenant level subscription with dedicated capacity
- P scale from P1 up to P5
- P1 = 8 vCores, P5 = 128 vCores
- App users don't need a Pro license

No longer available. Existing users can continue until contract is up for renewal

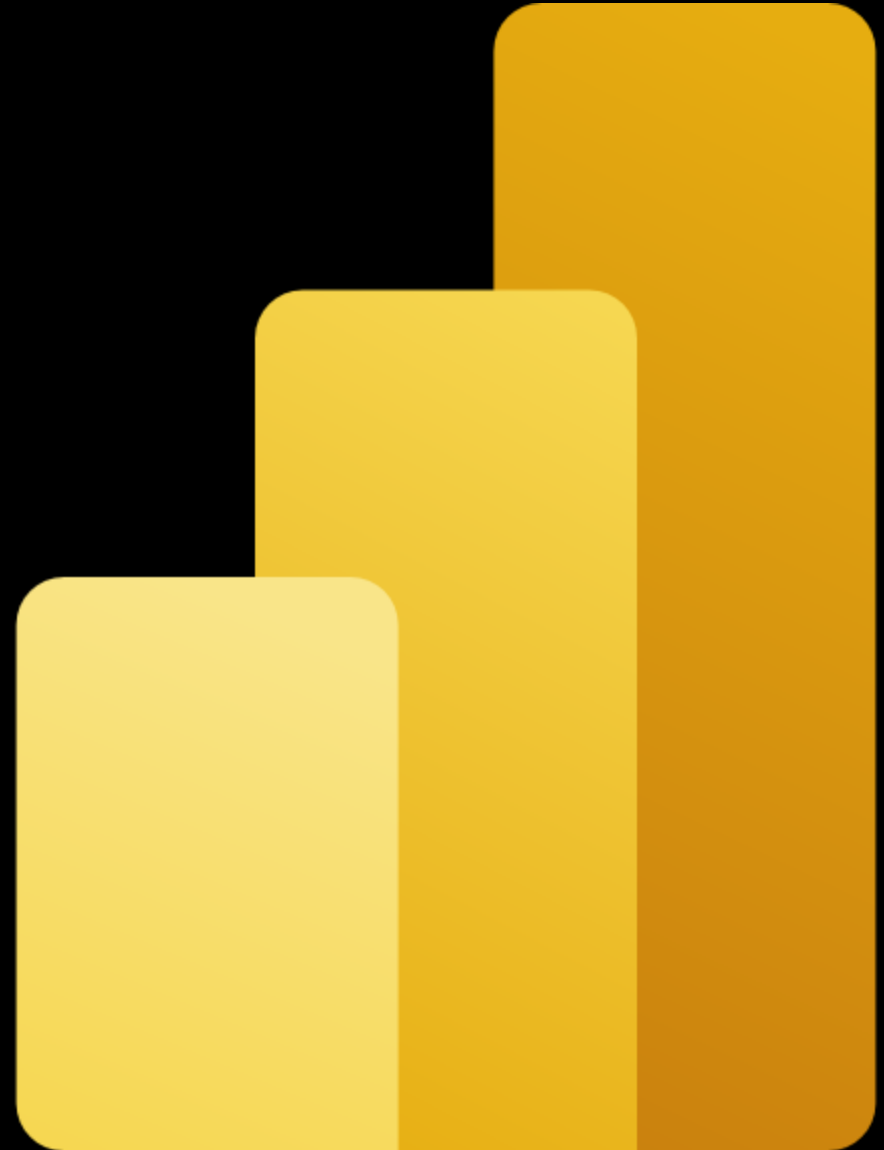


Power BI Embedded in O365

- Tenant level subscription with dedicated capacity
- EM is meant for internal embedding
- EM scales from EM1 to EM3
- EM 1 = 1 vCore, EM3 = 4 vCores (F8-F32)
- App users need a Pro license
- Users authenticate via Entra ID

Power BI embedded in Azure

- Power BI capacity without need for user licenses
- Aimed at external users
- Scaling from A1 up to A8 (P5)
- A1 = 1 vCore, A8 = 128 vCores
- Authenticate with own authentication method
- Non-interactive authentication. Your app uses a *service principal* or a *master user* to authenticate





Fabric licensing

Fabric capacities

- 3 ways to get Fabric capacity:
 - Trial
 - Fabric capacity
 - Power BI Premium capacity



Fabric licensing
model is that
easy?



Fabric Capacity

- You will see both the term SKU and CU
- SKU = Stock Keeping Units
- CU = Capacity Units
- There are 2 types of SKU
 - Azure SKU
 - Microsoft 365 SKU (discontinued June 2024)



Fabric Capacity

- Azure SKU
 - Billed per second and storage space
 - No commitment
 - Can be paused (storage still being billed)
 - Bought and set up via Azure
- Microsoft 365 SKU
 - Billed monthly or yearly
 - Monthly commitment
 - Actually P SKUs
 - No new customers on P SKU from June 2024



Fabric Capacity

- SKUs start at F2 and scales to F2048
- F64 = P1 = 8 vCores – or 64 CU
- F1024 = P5 = 128 vCores – or 1024 CU
- F2048 = 256 vCores – or 2048 CU
- F64 and above = no Pro or PPU license for Power BI app users.
- Fabric users still need Pro to develop or access workspaces



So... What separates the SKUs?

- Fabric SKUs have 3 main differentiators
 1. Storage
 2. Compute
 3. Concurrency limits

1. Storage

- Storage is billed separately
- Storage does NOT consume CUs
- Transactions however does...
- Higher cost for data outside capacity
- Shortcuts
- Then there's DirectLake



1. Storage

DirectLake

- Lets Semantic models bypass SQL endpoints
- SKU limitations on several parameters
- Table size
 - a) Number of Parquet files
 - b) Number of row groups
 - c) Rows per table in millions



1. Storage – DirectLake



Capacity	Number of Parquet files	Number of Row Groups	Rows per table in Millions	Max Model Size on disk	Max Memory in GB
F2	1.000	1.000	300	10	3
F64	5.000	5.000	1.500	Unlimited	25
F1024	10.000	10.000	24.000	Unlimited	400

2. Compute

Specifically burstable capacity in data warehouse (and SQL endpoints)

- A capacity is a distinct pool of resources
- SKU determines size of said pool
- Baseline and burstable capacity
- Baseline CU = Fx



2. Compute

- Background operations:
- Trading in future CU usage
- This is called Smoothing
 - $\text{CU used} / \text{duration} / \text{Baseline CU} = \text{Scale factor}$
 - Lower capacity has higher Scale factor
 - F2 = x32 – F8 and up = x12
- Interactive operations:
- Consumes CU on runtime



2. Compute

- Throttling
- Eg. If overuse over 24 hours – throttling starts
- Background rejection normal policy
 - All new jobs rejected
- Exception for warehouse : data modeling
- Other throttle policies:
 - Overage protection
 - Interactive delay
 - Interactive rejection



2. Compute

- How to handle throttling:
 - Upgrade SKU
 - Find and fix overuse source(s)
 - Wait until throttling stopped
 - Pay your way out... (pause and restart)
 - Create alerts for overusage to avoid throttling
- Coming soon: Surge protection



3. Concurrency limits

Specific for Spark

- 1 CU = 2 Spark vCore
- FIFO queue
- Burstable CU for 3x baseline CU
- Throttle = rejection
- Currently – default spark pool medium size...



Fabric Copilot Capacity (FCC)

- New Offering
- Problem:
Users accessing different workspaces bound to different capacities/licenses --> hard to determine where Copilot is available or not
- Fabric Copilot Capacity is assigned to users
- Users can then use Copilot no matter which workspace they access



Benefits of FCC

- Improved access to Copilot
- Simplified Setup
- Consolidated Copilot spend
- Data Protection



How to set up

- Create Fabric Capacity
- Enable admins as FCC admins
- Designate Capacity as FCC

Fabric capacity

Fabric Capacity is a set of computing resources used for creating, publishing, and sharing Microsoft Fabric items. Fabric Capacities are purchased through Microsoft Azure services. [Learn more](#)

Details

Delegated tenant settings

▸ Disaster Recovery

▸ Capacity usage report

▸ Surge Protection

▸ Notifications

▾ Copilot capacity

Enabled for a subset of the organization

Turn on this setting to designate this capacity as a Fabric Copilot capacity. Copilot capacities are special capacity types that allow your organization to consolidate users' Copilot usage and billing on a single capacity. Copilot capacities may not be available in all regions. [Learn more](#)

Select the users or user groups who can use this capacity for their Copilot usage and billing.

Apply to:

☐ The entire organization

☒ Specific users or groups

Clear all

AT Armando Test

Fabric Admin

Apply

Discard

So what does this all mean?

- How can we know what things *actually* costs?
- Let us look at some samples...



List price

Your Estimate



^ Microsoft Fabric



F64, 64 Capacity units x 7.5 Hours, OneLake storage...



Upfront: \$0.00

Monthly: \$106.80

Microsoft Fabric

Region:

West Europe



^ Microsoft Fabric



F512, 512 Capacity units x 7.5 Hours, OneLake stora...



Upfront: \$0.00

Monthly: \$846.00

Microsoft Fabric

Region:

West Europe



Eventstream Capacity

OPERATION IN CAPACITY METRICS APP	DESCRIPTION	OPERATION UNIT OF MEASURE	FABRIC CONSUMPTION RATE
Eventstream Per Hour	Flat charge* (per eventstream)	Per hour	0.222 CU per hour
Eventstream Data Traffic per GB	Data ingress & egress volume	Per GB	0.342 CU per hour per GB
Eventstream Processor Per Hour	Computing resources consumed by the processor	Per hour	0.778 CU per CPU hour**
OneLake Standard Storage	Used for extended retention (Includes 24-hour retention)	Per GB	\$0.023 per GB***
Eventstream Connectors Per vCore hour	Computing resources consumed by the connector	Per hour	0.611 CU per vCore hour

*Eventstream is charged if Eventstream is not idle (i.e. data is not ingested or egressed for at least 2 hours)

**Processor base rate 2.333 CU per hour, starting at 1/3 CPU hour (0.778)

***Refer to OneLake Storage pricing for more detail - [Microsoft Fabric - Pricing](#) | [Microsoft Azure](#)

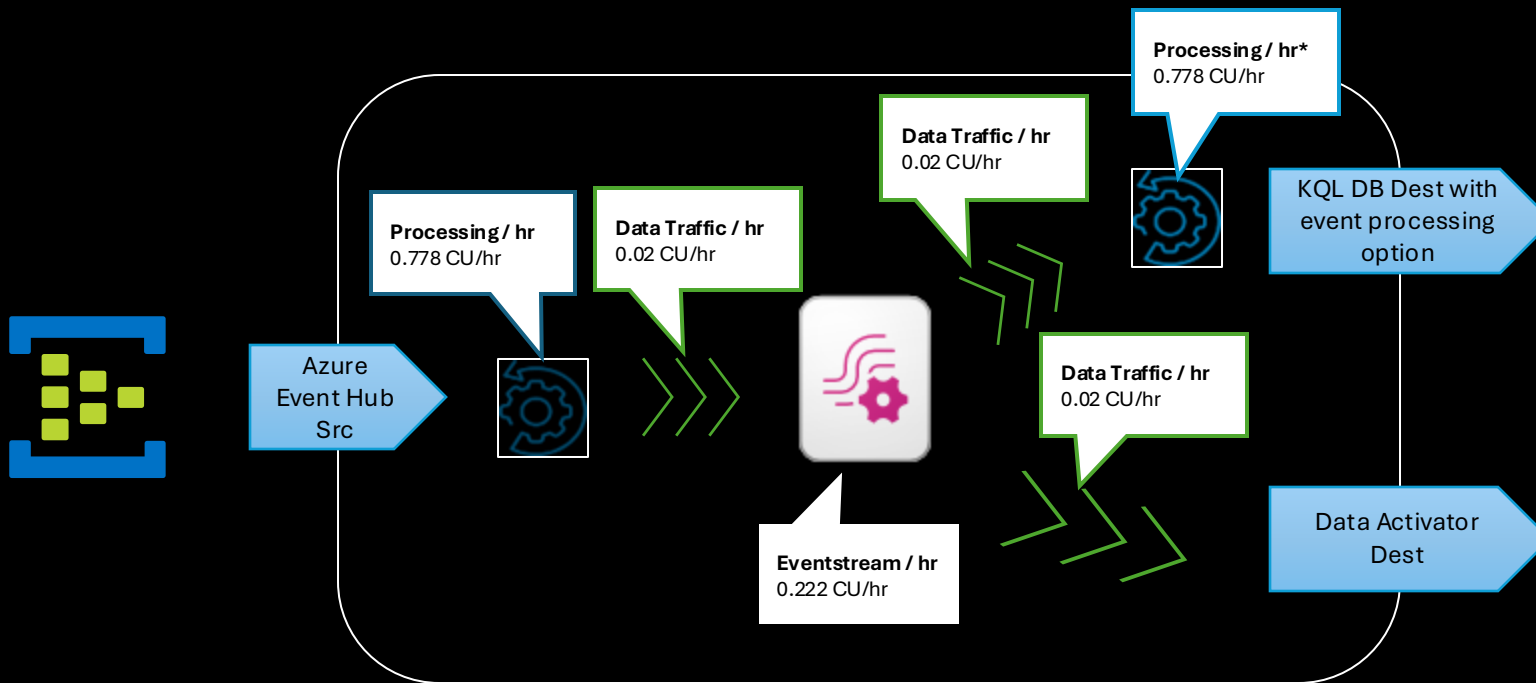
[Monitor Microsoft Fabric event streams capacity consumption](#) - [Microsoft Fabric](#) | [Microsoft Learn](#)

Real price example

Microsoft Fabric	Compute Pool Capacity Usage CU	800,34
Microsoft Fabric	Eventhouse Capacity Usage CU	198,24
Microsoft Fabric	eventstreams Processor Capacity Usage CU	83,37
Microsoft Fabric	eventstream Capacity Usage CU	23,91
Microsoft Fabric	Spark Memory Optimized Capacity Usage CU	23,35
Microsoft Fabric	eventstream Data Traffic Capacity Usage CU	5,87
Microsoft Fabric	OneLake Iterative Read Operations via proxy Capacity Usage CU	0,67
Microsoft Fabric	OneLake Write Operations via proxy Capacity Usage CU	0,27
Microsoft Fabric	Data Warehouse Capacity Usage CU	0,11
Microsoft Fabric	OneLake Read Operations via proxy Capacity Usage CU	0,05
Microsoft Fabric	OneLake Other Operations Capacity Usage CU	0,04

Eventstream usage scenario

An eventstream is ingesting from an Azure Event Hub source that is coming in at **1 MB/minute (0.059 GB/hr)**. The data is transformed and filtered before sending to a KQL DB destination and also routed to a Data Activator destination.



Total CU/hr: **1.838 CU**

*Processing can cost more depending on transformation complexity (e.g. aggregation)

**Does not include downstream costs for KQL DB and Data Activator

Eventhouse Usage Scenerio



Eventhouse
4.25 Cores
100 GB in Cache
500 GB Total Storage

Capacity via Activity

Queries or Command or Ingestion
80% active would need 3.4 CUs and require
min 4 CUs



Storage

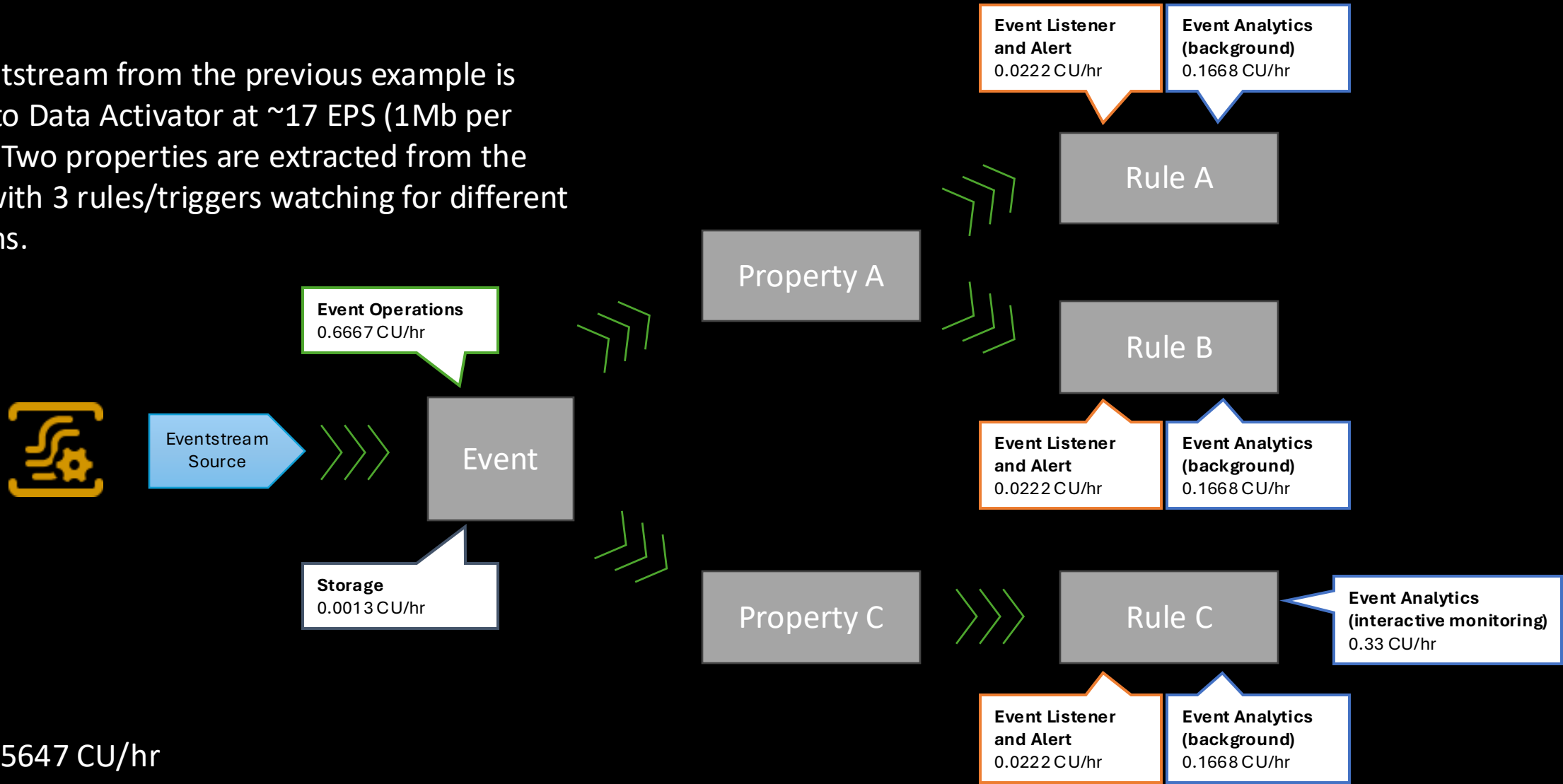
100 GB at Premium Storage (~\$0.20/GB)
500 GB at Standard Storage (~\$0.02/GB)

Data Activator – Consumption Meters

BILLING METER	DESCRIPTION	OPERATION UNIT OF MEASURE	FABRIC CONSUMPTION RATE
Real-Time Intelligence – Event Listener & Alert	Flat charge per rule (trigger)	Per hour	0.0222 CU
Real-Time Intelligence – Event Operations	Data ingress	Per M events*	11.111 CU
Data Activator – Event Analytics	Events processed to evaluate rules, run queries etc.	Per M events	2.78 CU
Storage		Per GB/ month	1.333 CU

*Event size 0-1Kb = 1 event, 1-2Kb = 2 events, 2-3Kb = 3 events etc.

The eventstream from the previous example is sending to Data Activator at ~17 EPS (1Mb per minute). Two properties are extracted from the events, with 3 rules/triggers watching for different conditions.



Total = 1.5647 CU/hr

What to use when

- If predictability important -> Pre-purchase
- If complicated cost splitting -> many small F
- If need for more power -> F+
- How to calculate SKU needs?
- Coming soon: Fabric SKU calculator

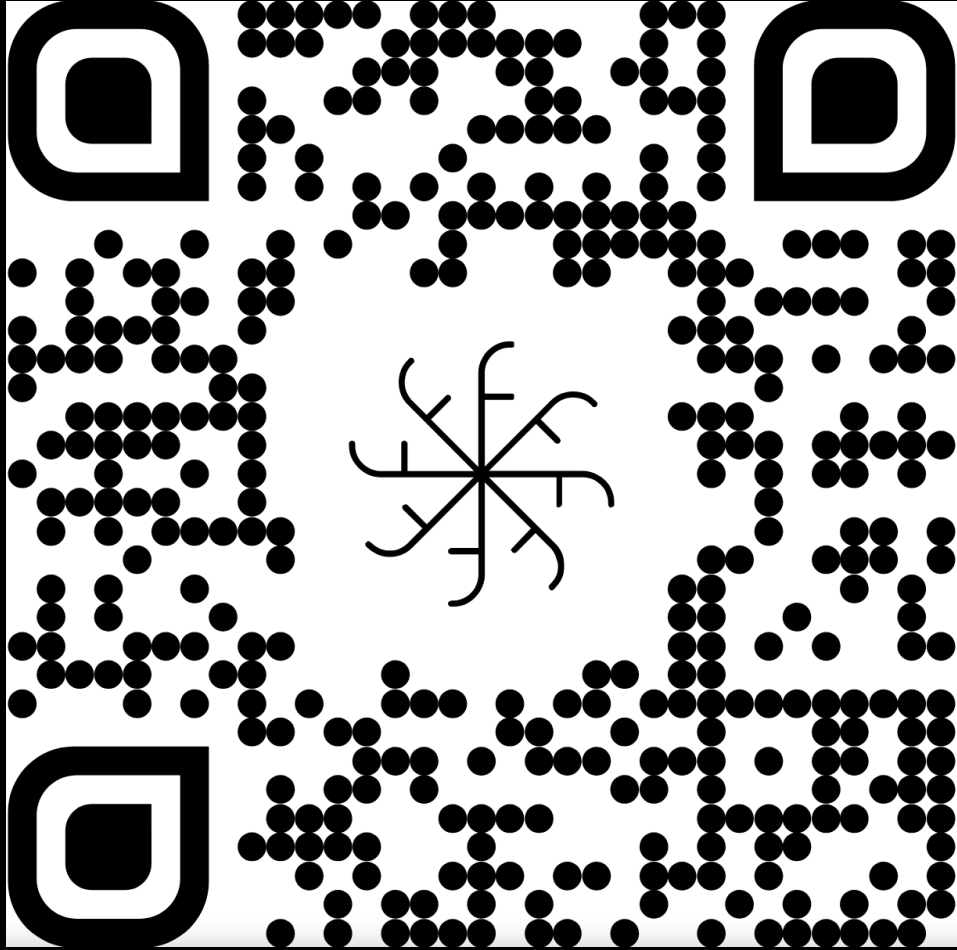


Usage patterns

- No Premium capacity yet?
- Existing Premium customers – do all your reports need to be on Premium?
- One big shared capacity or several smaller?
- Fabric as front of a larger ecosystem?












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GitHub

Community Person

Organizer Global AI Bootcamp Lüdinghausen
On the board of PASS Deutschland e.V.
Chapter Lead of PASS RG Münsterland

When not geeking out over new tech

Listening to Metal
Doing some decent BBQ
Going on "Adventures" with my 7y old daughter



Johan Ludvig Brattås

Director, Deloitte



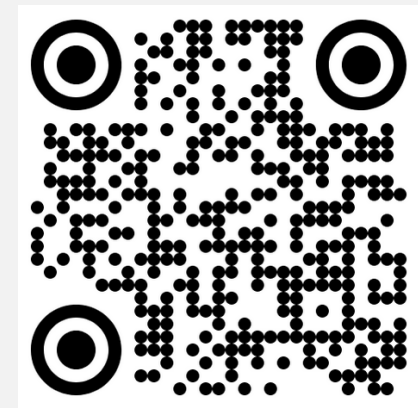
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Co-organizer – DataSaturday Oslo

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Frequent volunteer in general

When not geeking out over new tech

Teaching coeliacs how to bake gluten free

Baking

Hiking

Gardening