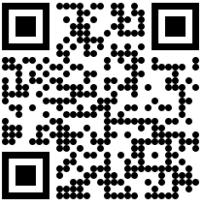


Slides at

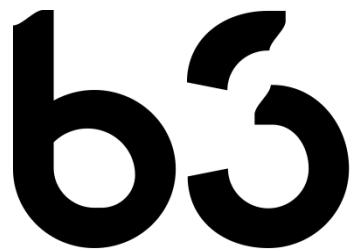


**Benni De Jagere**

**POWER BI PREMIUM  
PRACTICAL TIPS TO MAKE THE MOST OF IT**



Attollo



B3 Consulting Group



Quest Software



SQL Service



dbWatch



Transmokopter SQL



Catman Solution



DB24



redgate

Redgate Software

# WHO AM I



Power BI CAT

**dataMinds.be** Member



@BenniDeJagere



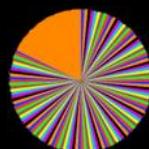
/bennidejagere



/bennidejagere



/bennidejagere



#SayNoToPieCharts

# OBJECTIVES

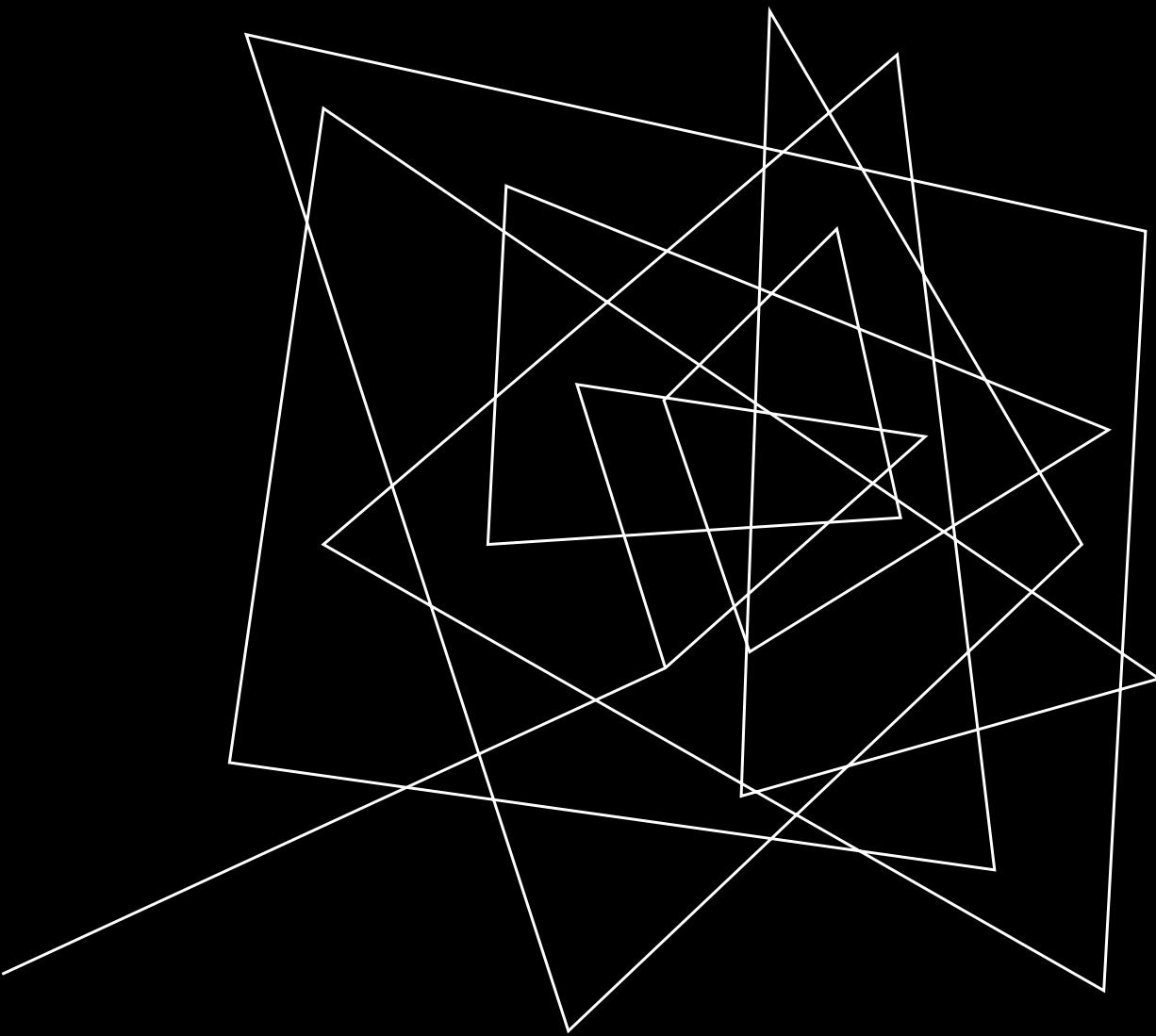
---

Set the scene on Power BI Premium Gen 2 +  
PPU

Usable tips to assist daily tasks

Convince proactive monitoring is key

**NOTE:** Power BI Premium Gen 1 is not covered, nor is Multi-Geo



**LET'S START!**

# POWER BI PREMIUM?

Dedicated Reserved Capacity for your organisation

Provides a richer feature set

Some features are Premium First, Pro later (or not ..)

Support for:

Data residency by region (Multi-Geo)

Customer-managed encryption keys for data at rest (BYOK)

Users can access artefacts with a free Power BI Subscription

NOT Easy-mode for performance & optimisation

# RESOURCE OVERVIEW PER CAPACITY

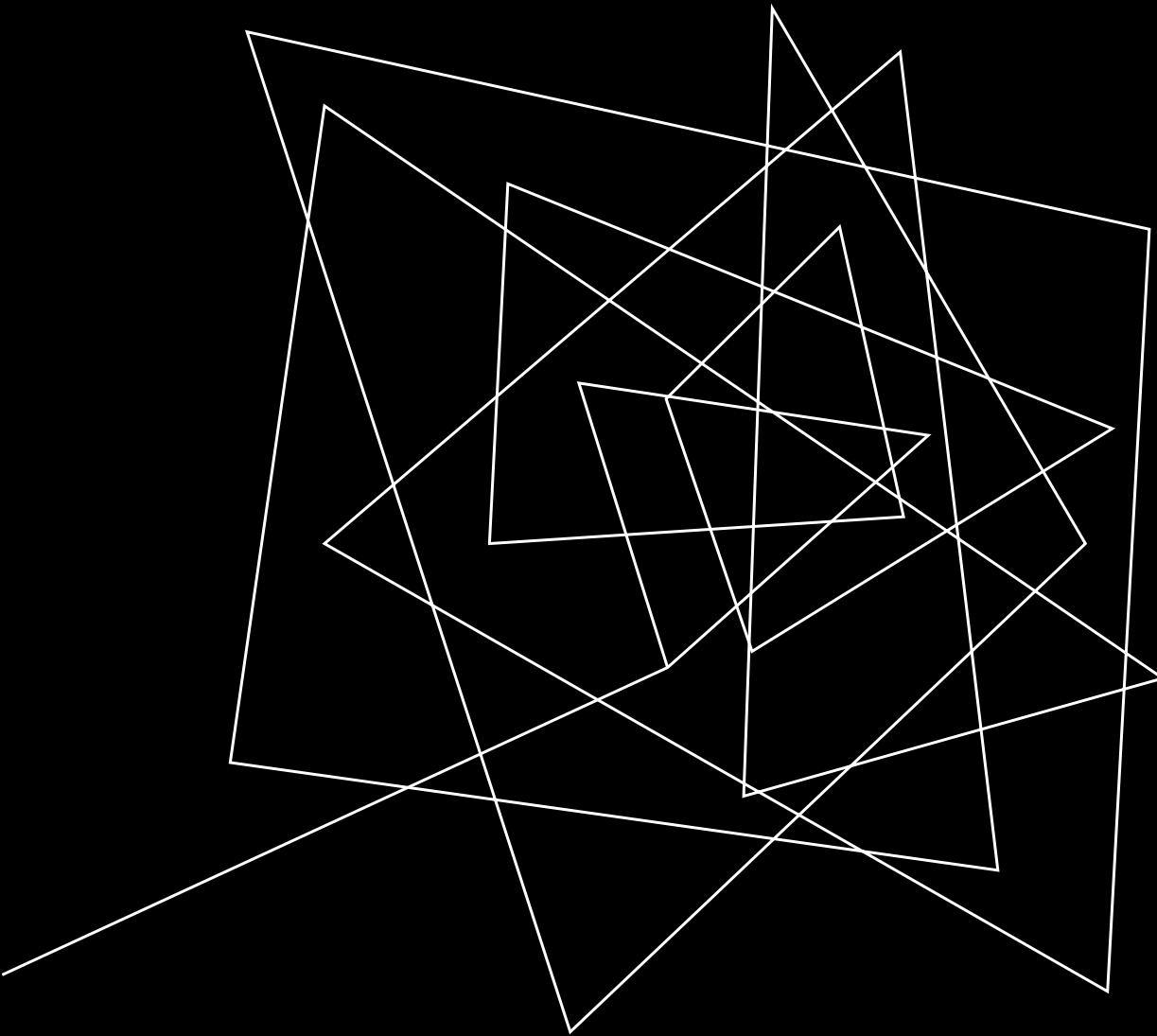
Capacity SKUs	Total v-cores	Backend v-cores	Frontend v-cores	RAM (GB) <sup>1, 2</sup>	DirectQuery/Live connection (per second) <sup>1, 2</sup>	Max memory per query [GB] <sup>1, 2</sup>	Model refresh parallelism <sup>2</sup>
---------------	---------------	-----------------	------------------	--------------------------	--	---	--

<sup>1</sup> The Power BI Premium Utilization and Metrics app doesn't currently expose these metrics.

<sup>2</sup> These limits only apply to dataset workloads.

<sup>3</sup> SKUs greater than 100 GB are not available in all regions. To request using these SKUs in regions where they're not available, contact your Microsoft account manager.

P2/A5	16	8	8	50	60	6	80
P3/A6	32	16	16	100	120	10	160
P4/A7 <sup>3</sup>	64	32	32	200	240	10	320
P5/A8 <sup>3</sup>	128	64	64	400	480	10	640



**HOW DOES IT  
WORK?**

# POWER BI PREMIUM GEN 2



Flexibility to license by capacity **AND** by user



Up to 16X performance boost



Scale capacity when needed with Autoscale



Consistent and reliable cost-management

# KEY CONCEPTS

A few key concepts to remember:

Under the covers, everyone operates on “P3” shared nodes

Goodbye Dedicated Capacity, hello Reserved Capacity!

Usage metrics shift from memory & cpu usage to cpu usage

Usage metrics now return 14 days by default

# ADVANTAGES

Organisational Noisy Neighbours are limited

Load balancing will block out memory for your process

Cross-workload resource contention is eliminated

Resource limitations shift to:

Total capacity CPU Throughput

Memory limit per artefact equivalent to your capacity sku limit

# BACKEND V-CORES

Backend v-cores are implemented on regional clusters

Shared by all tenants in that region

Clusters have resource groups, allocated to handle workloads

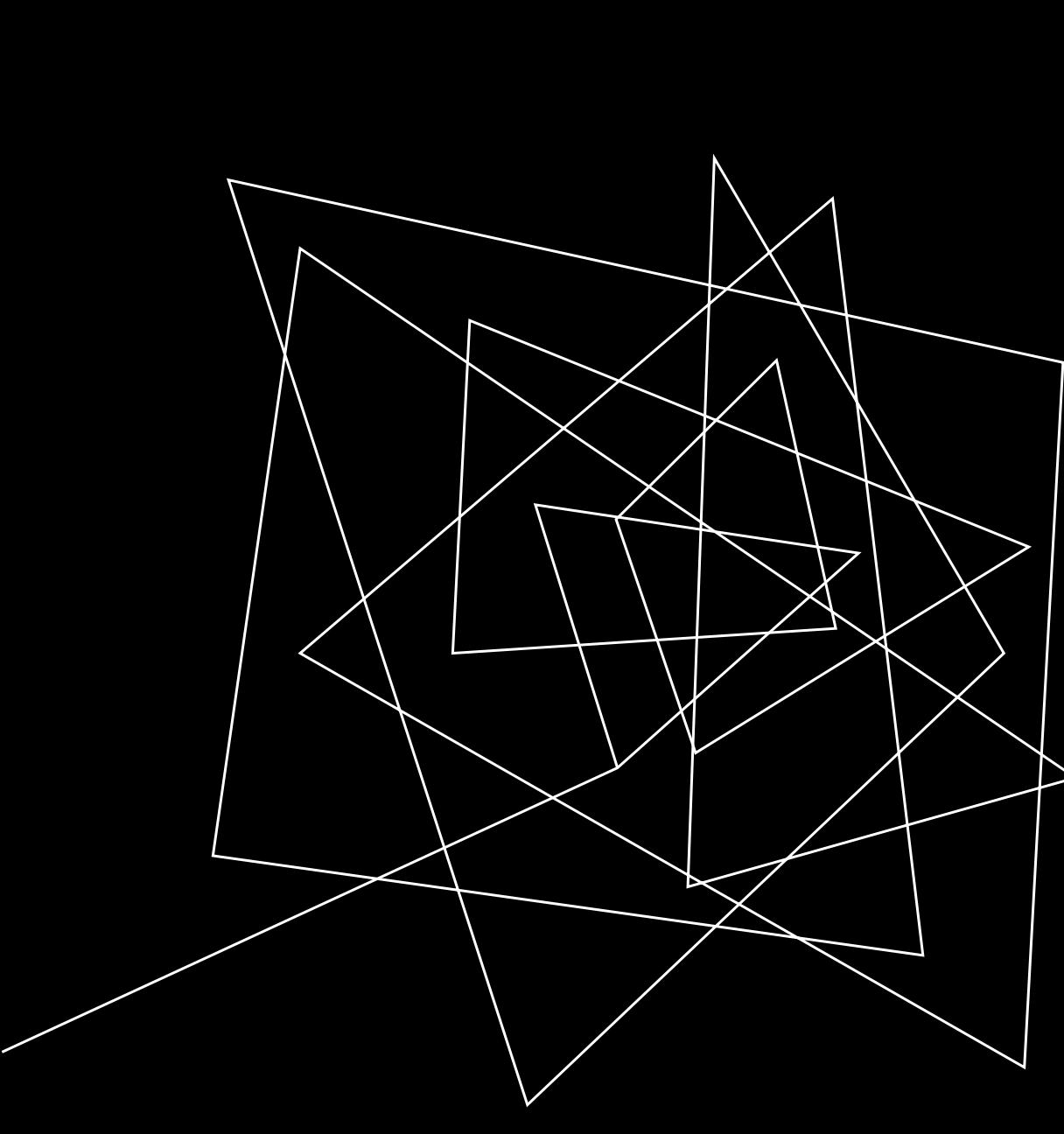
# STORAGE

Contents are stored on the organisational storage layer

Limited to 100TB per organisation, across all workloads

Loaded into shared compute nodes by request

Power BI handles load balancing



# LOAD EVALUATION

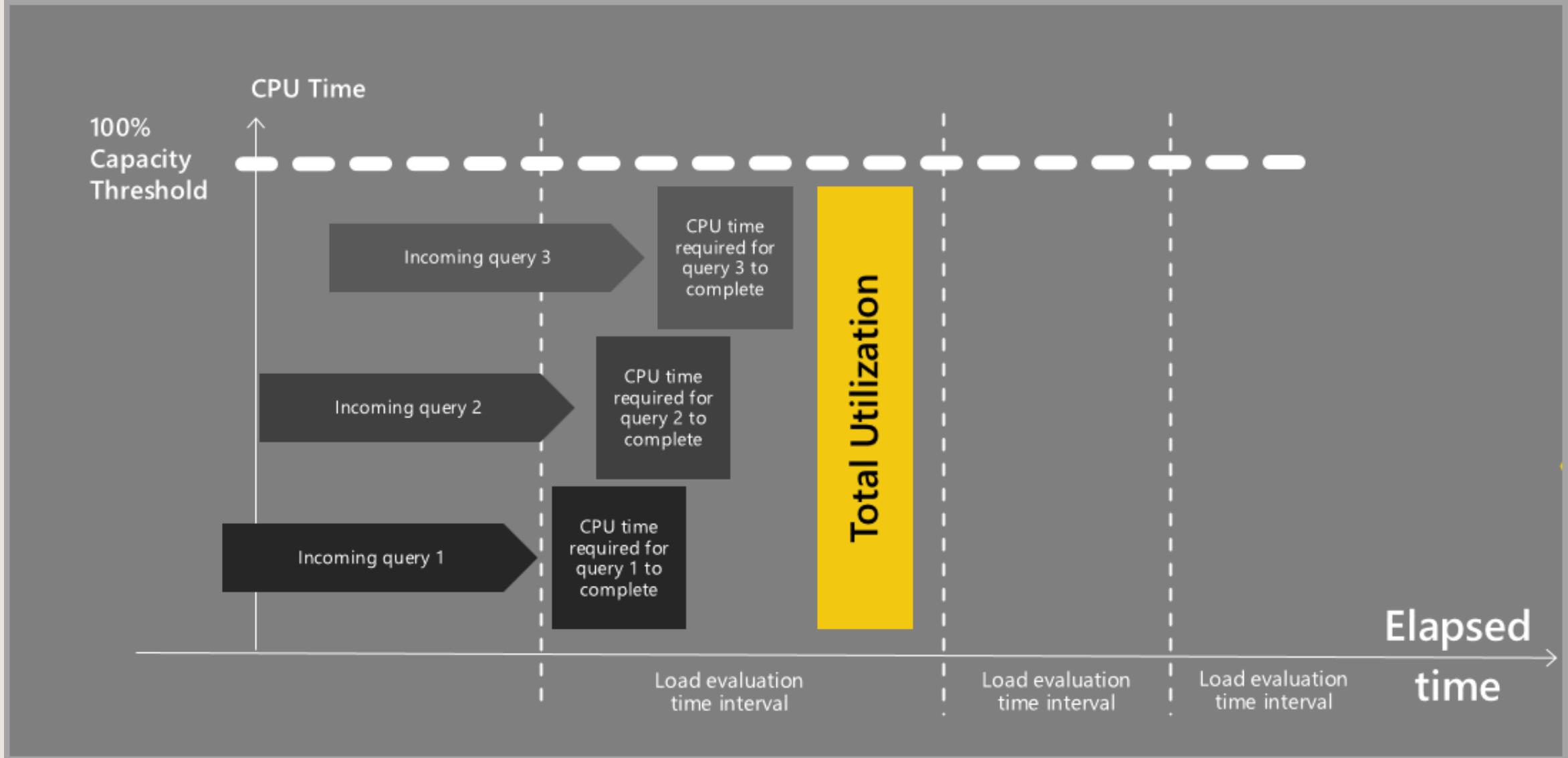
# LOAD EVALUATION

Based on your P-sku, you have an ‘allowance’ per cycle  
ie. P1 has 4 backend v-cores, for 30 seconds each.

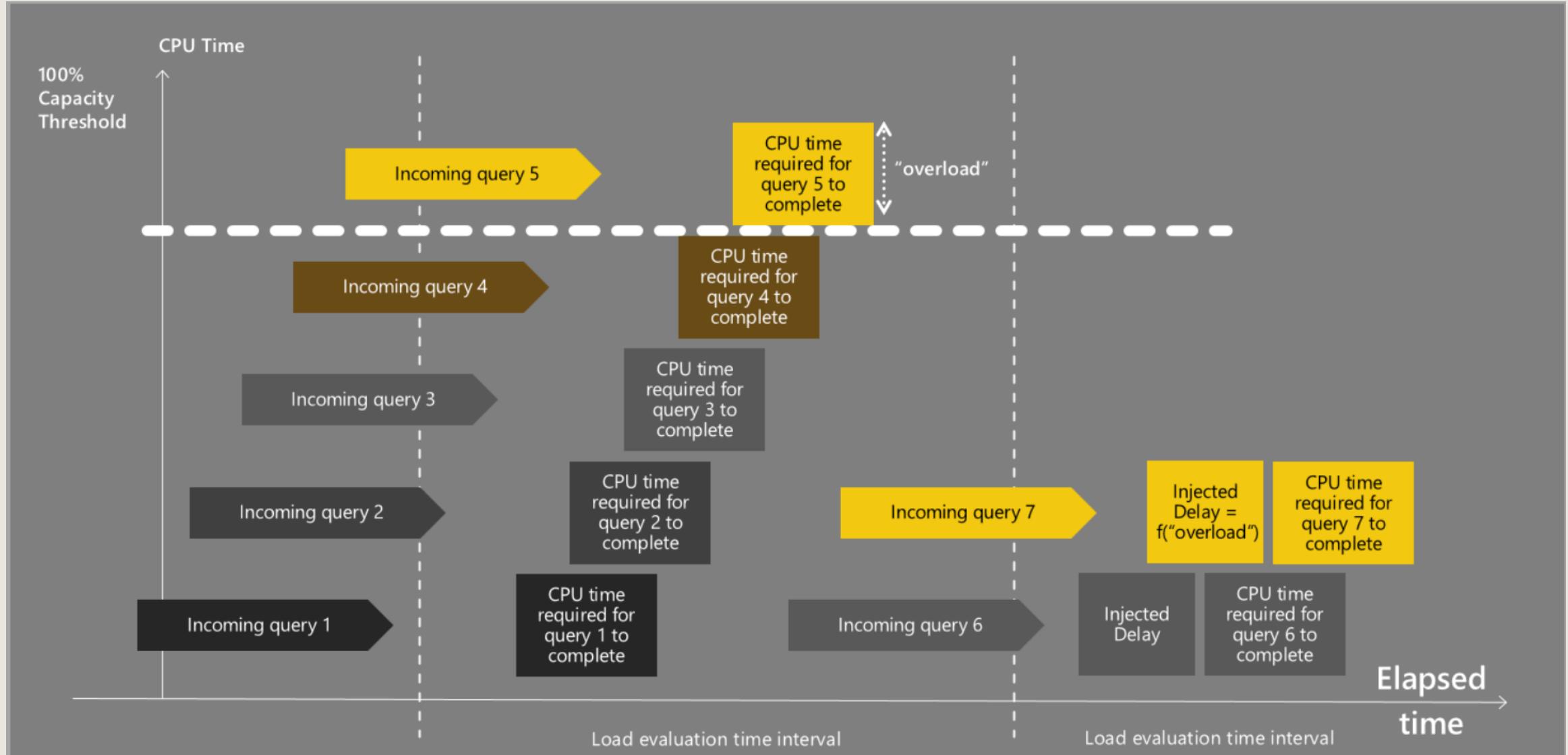
Every 30 seconds, Power BI evaluates throughput  
Slow operations (Background) are spread out across 24 hours  
Fast operations (Interactive) are aggregated to a 30 second window

Aggregation of these two determines load per cycle  
Keep in mind evictions still exist

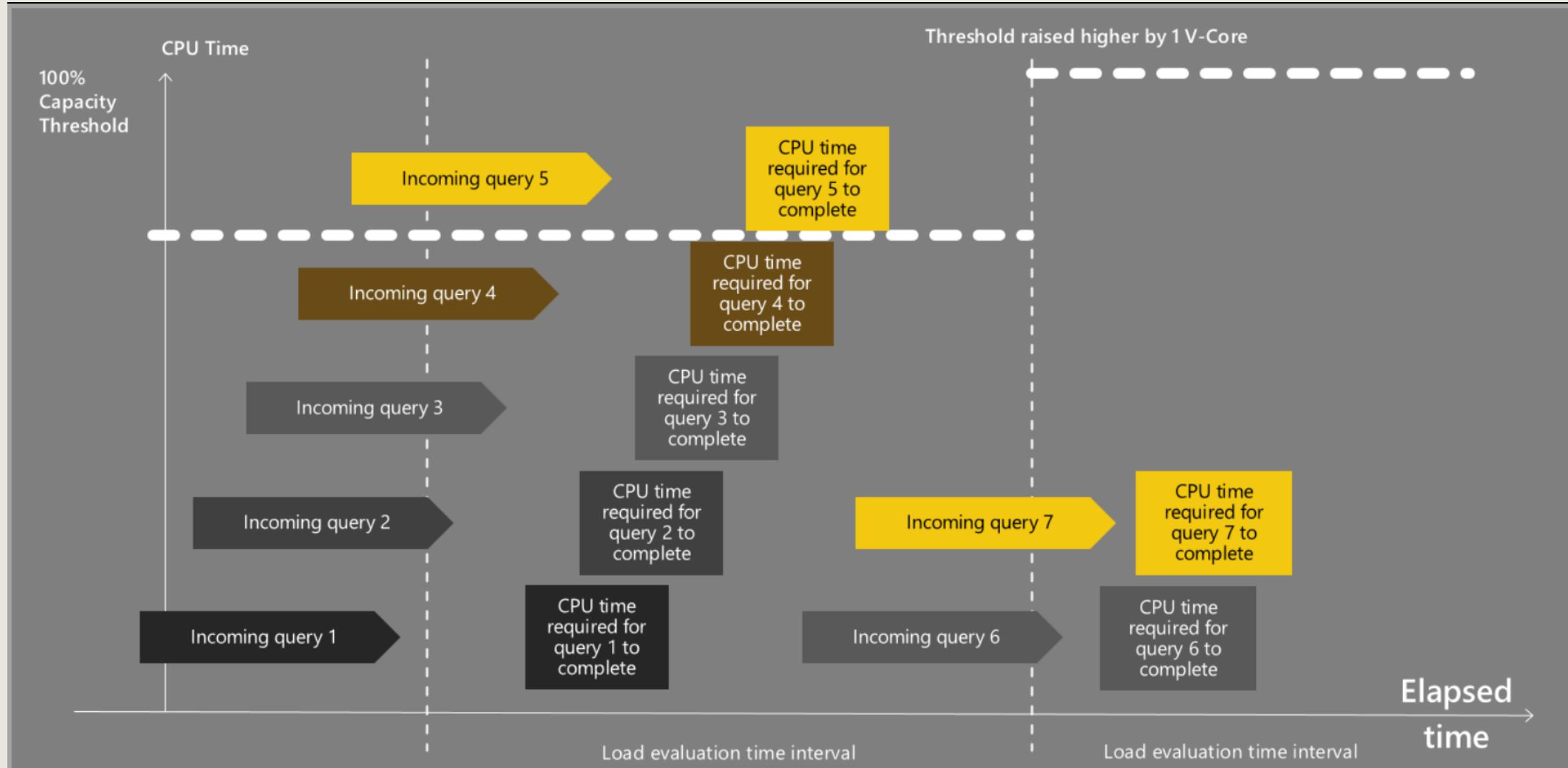
# LOAD EVALUATION



# LOAD EVALUATION



# AUTOSCALE



# AUTOSCALE

AutoScale can be configured per P Sku

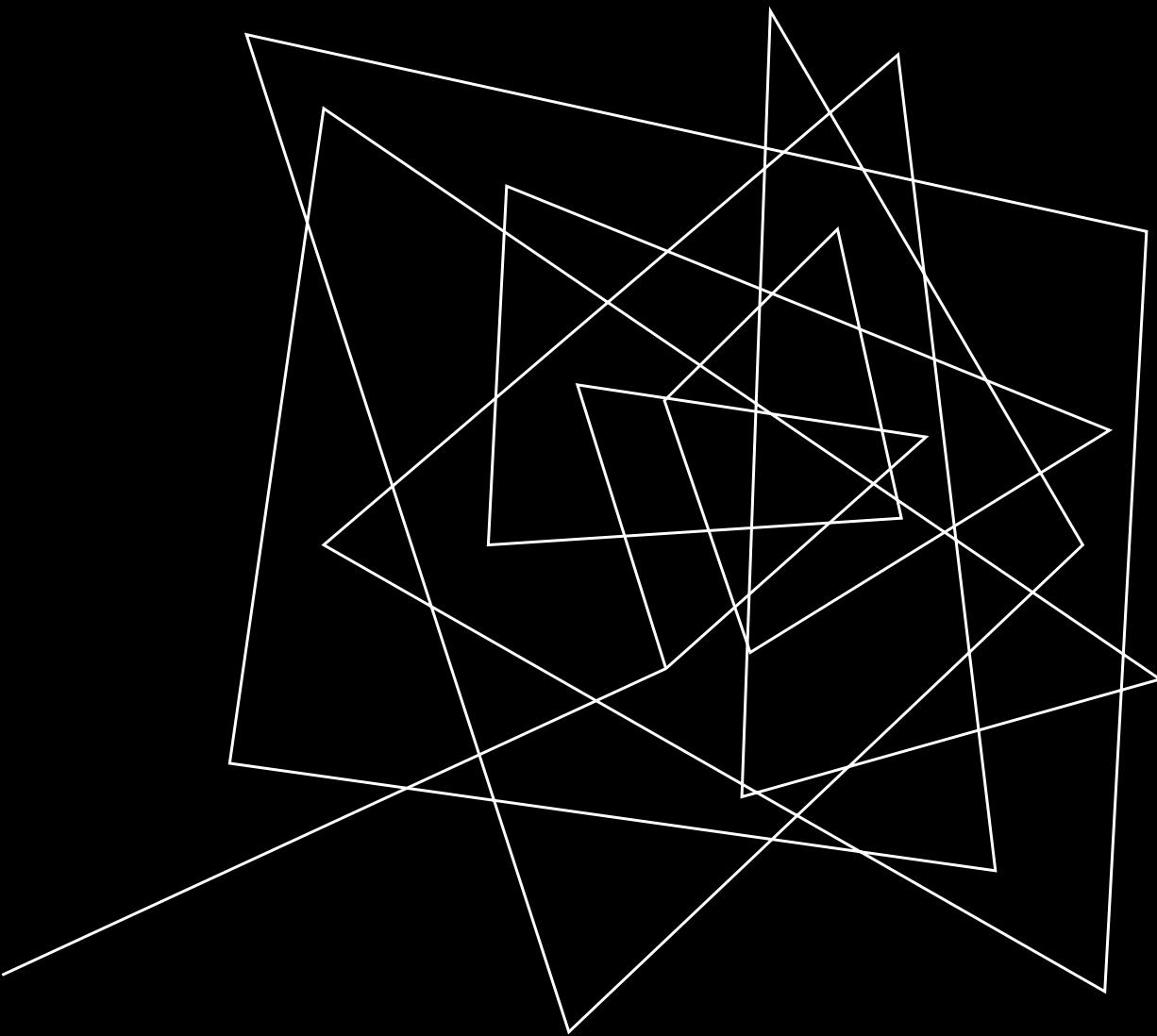
Reaching a load evaluation limit, AutoScale can kick in

For 24 hours, you'll receive an extra v-core

Up to maximum amount of v-cores you have for your capacity

Billed through your Azure Subscription

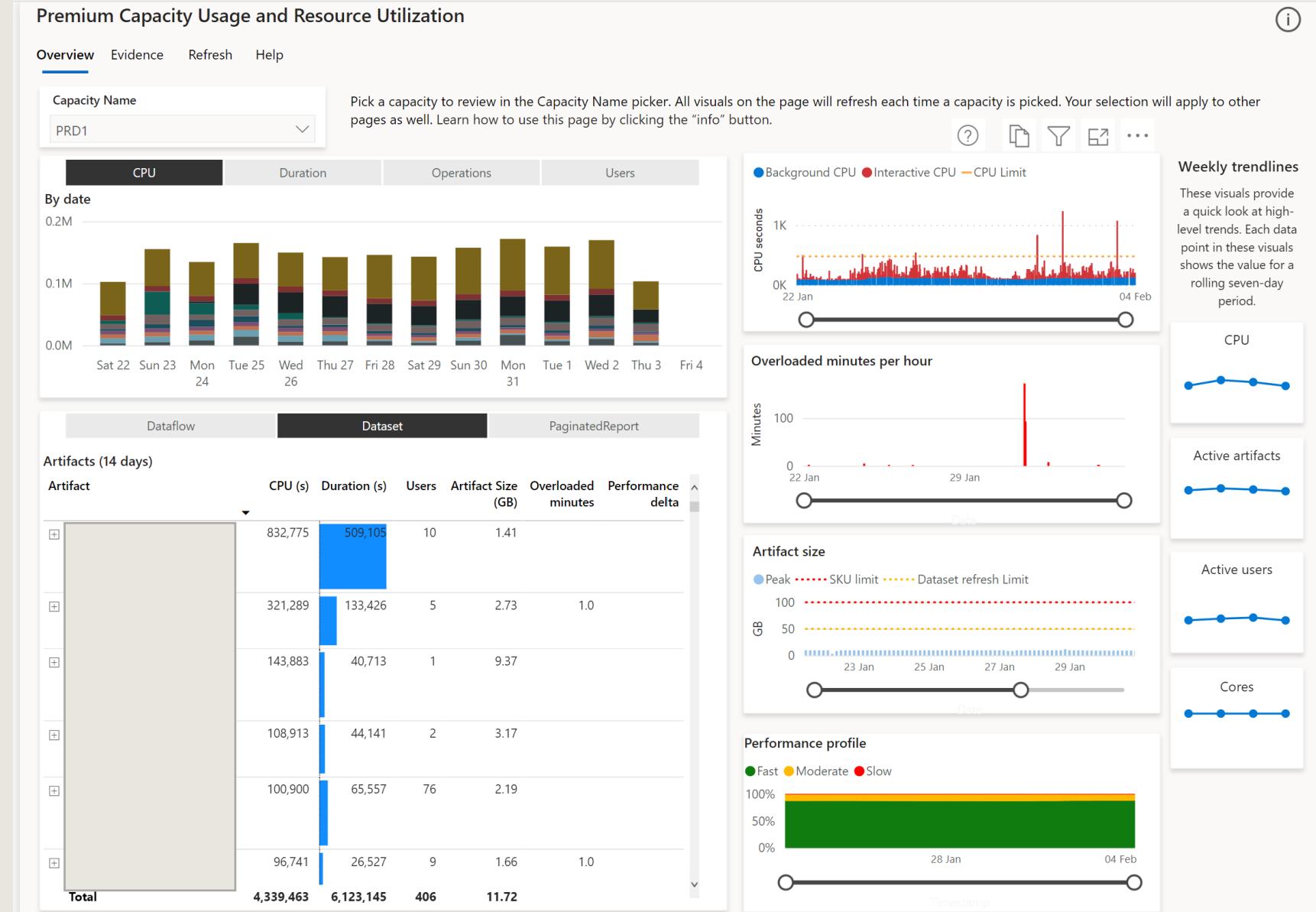
**TIP:** Set up reactive / proactive budget control



METRICS APP

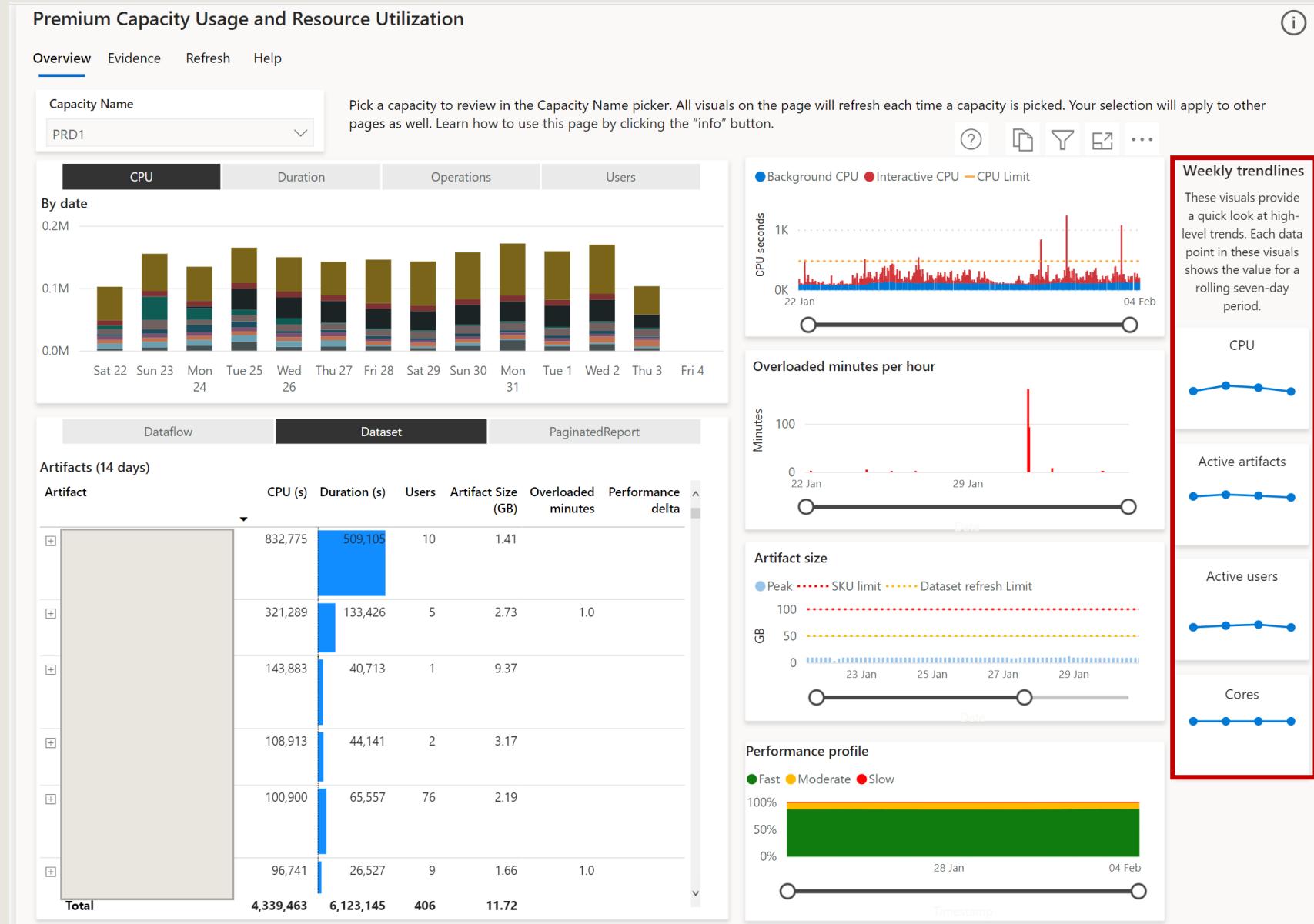
# PROACTIVE MONITORING

- Overview of your capacities
- Important trends over the last 14 days
- Starting Point is the Overview page for the CPU Metric



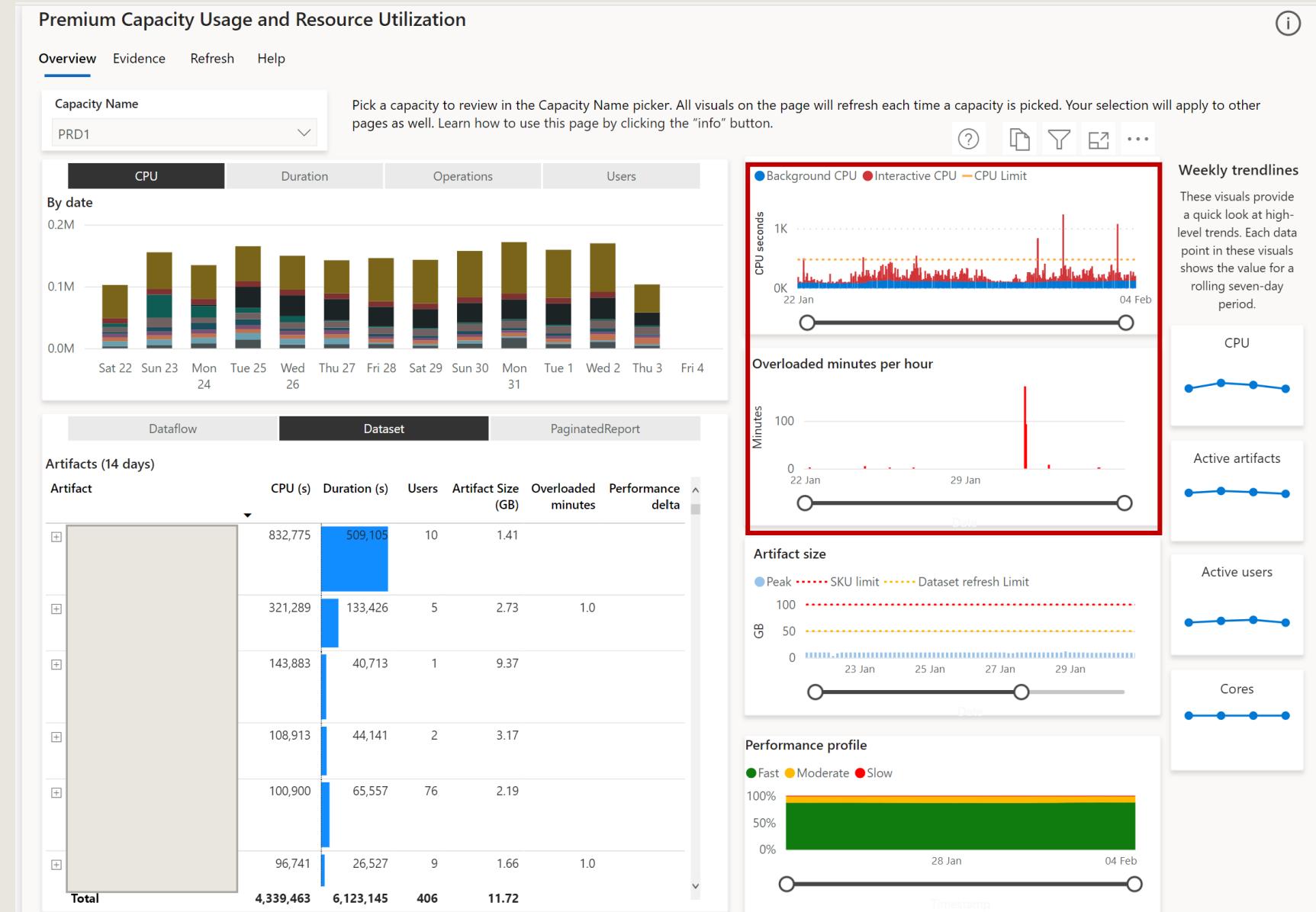
# PROACTIVE MONITORING

- Look at trends on the right panel
  - Do you see any rise in CPU, Active Users or Artifacts?



# PROACTIVE MONITORING

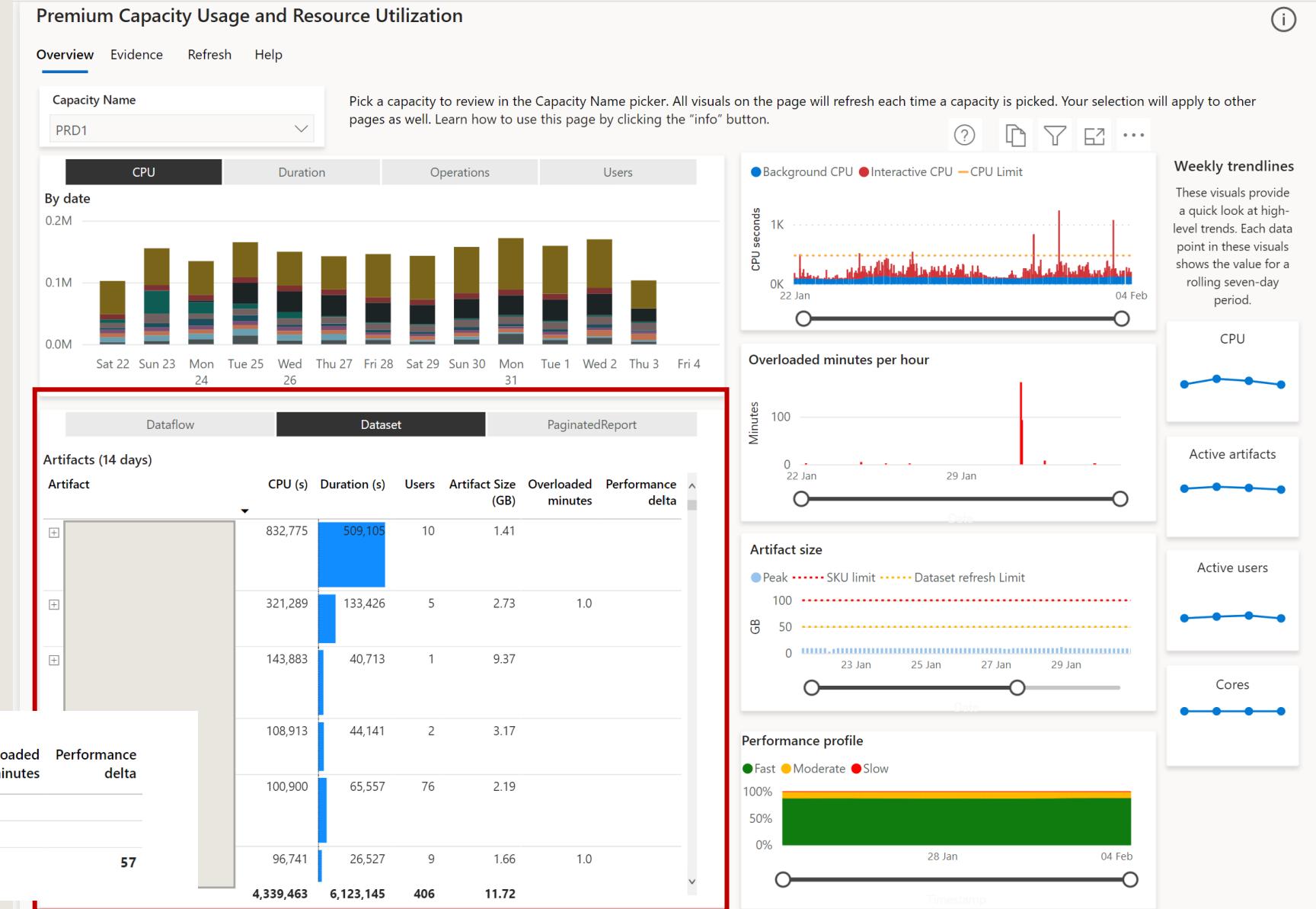
- How is the overall load of your capacity?
- Does Interactive CPU Util peak frequently over longer period of time or do we just see ad-hoc spikes
- Overloaded minutes per hour indicates that there have been some artifacts impacted by overloading → typically the most active artifacts are impacted by overloading
- Main contributor to overloading are possibly the artifacts with highest CPU (s)



# PROACTIVE MONITORING

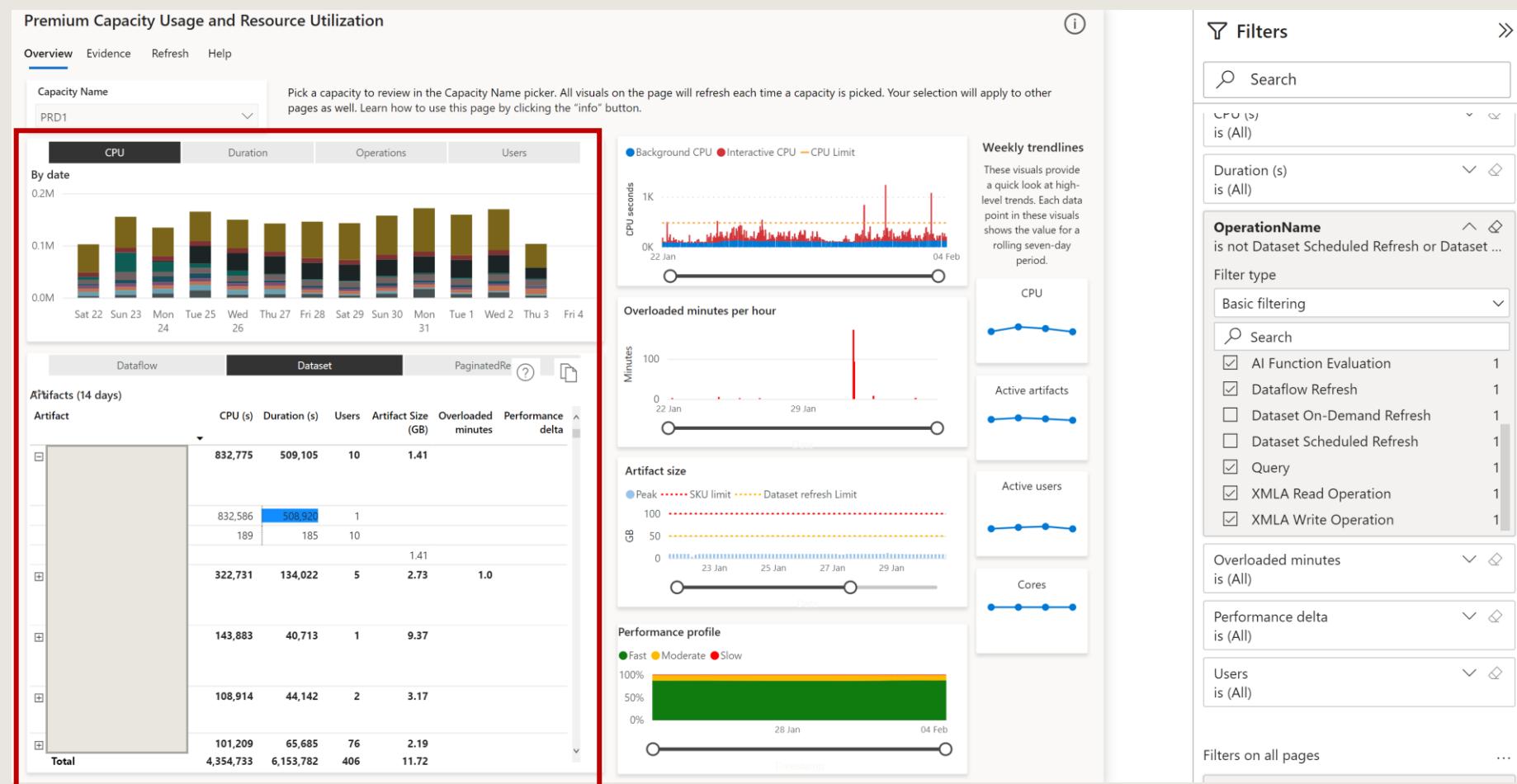
- This visual contains information about main contributors to overload maybe through CPU (s) and artifacts that are impacted most by overload (overloaded minutes)
- Keep in mind that this view show an aggregate of Background operation and Interactive Operations to get insights you have to drill through each artifact
- Or Create a saved version of the report and change the order of artifact and operationName

OperationName	CPU (s)	Duration (s)	Users	Artifact Size (GB)	Overloaded minutes	Performance delta
Query	672	485	2			
XMLA Read Operation	35	38	2			
<b>Total</b>	<b>707</b>	<b>523</b>	<b>3</b>	<b>1.28</b>	<b>57</b>	<b>11.72</b>



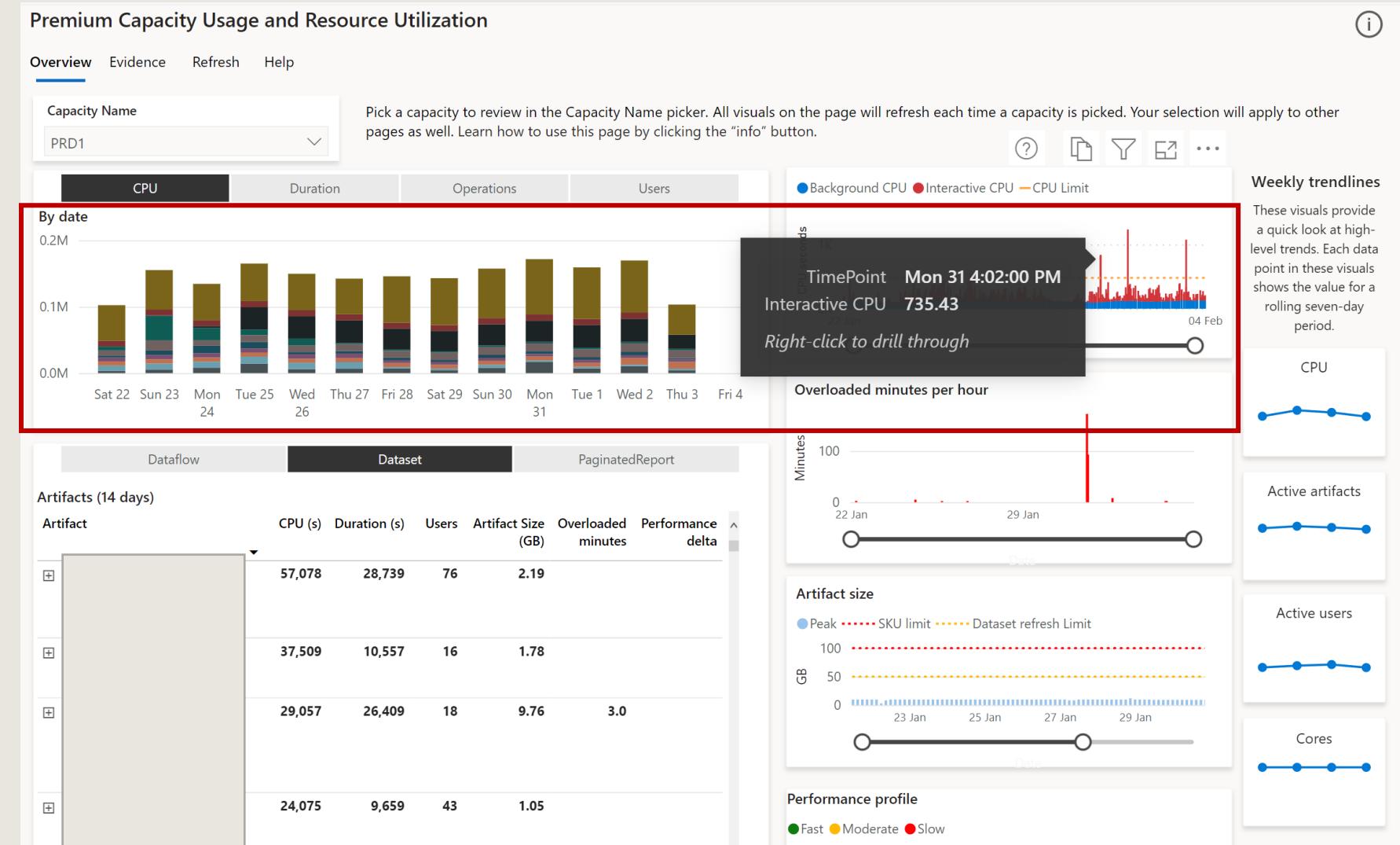
# PROACTIVE MONITORING

- With high cpu utilization we can filter for the artifacts visual to remove refresh operations and focus on interactive part, always dependent on the pain points
- We still look on a very “meaningless” aggregated view that defaults to 14 days
- To identify the the right artifacts for a time point we need more specific filtering on a specific day



# PROACTIVE MONITORING

- Mouseover on the CPU Util Visual on the right helps us identify potential days for further analysis
- To filter on specific days we can either work with the by date visual or with the filter pane
- I am using the by date

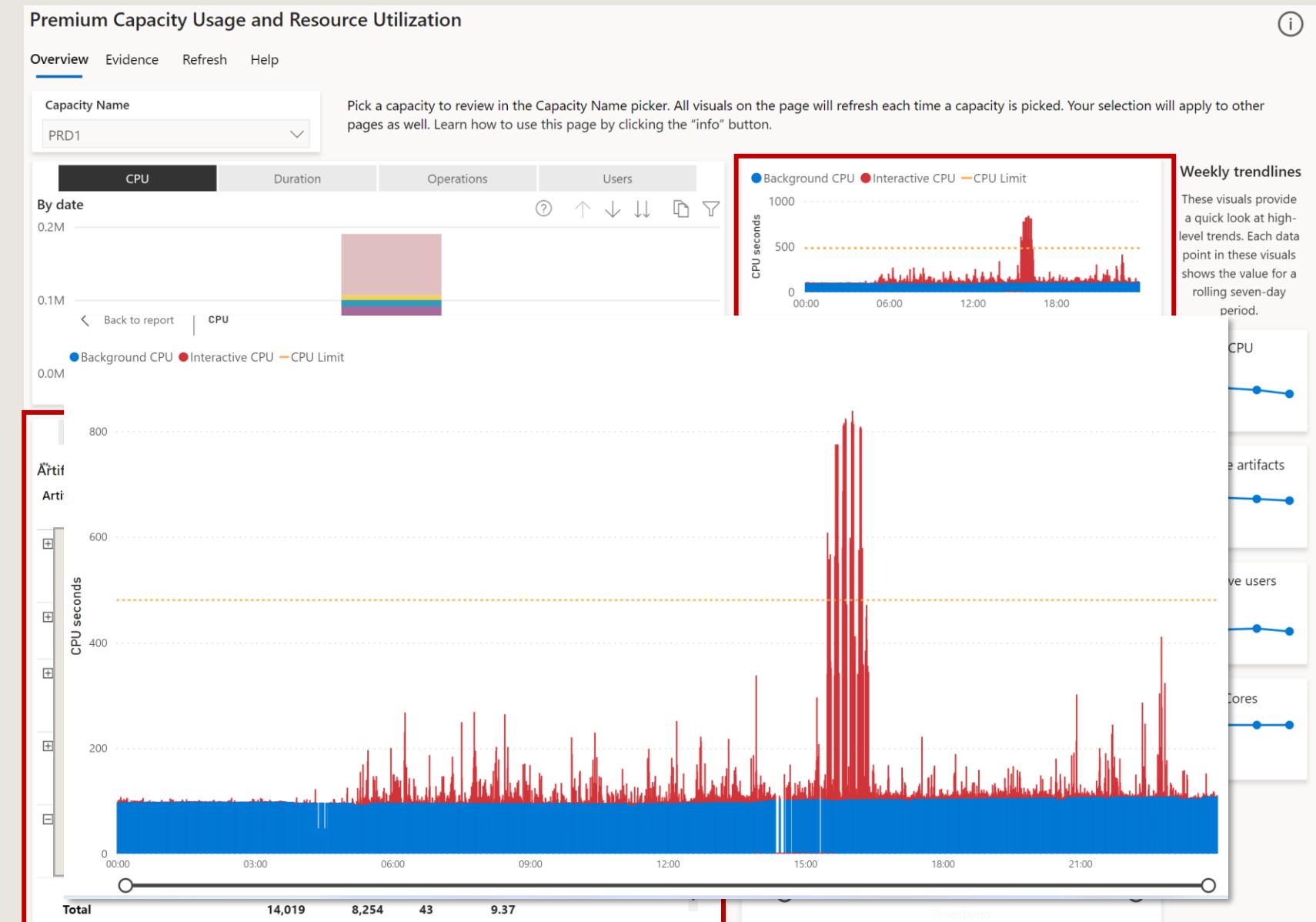


# PROACTIVE MONITORING

For more specific analysis on Interactive Querying we narrowed everything down to a day

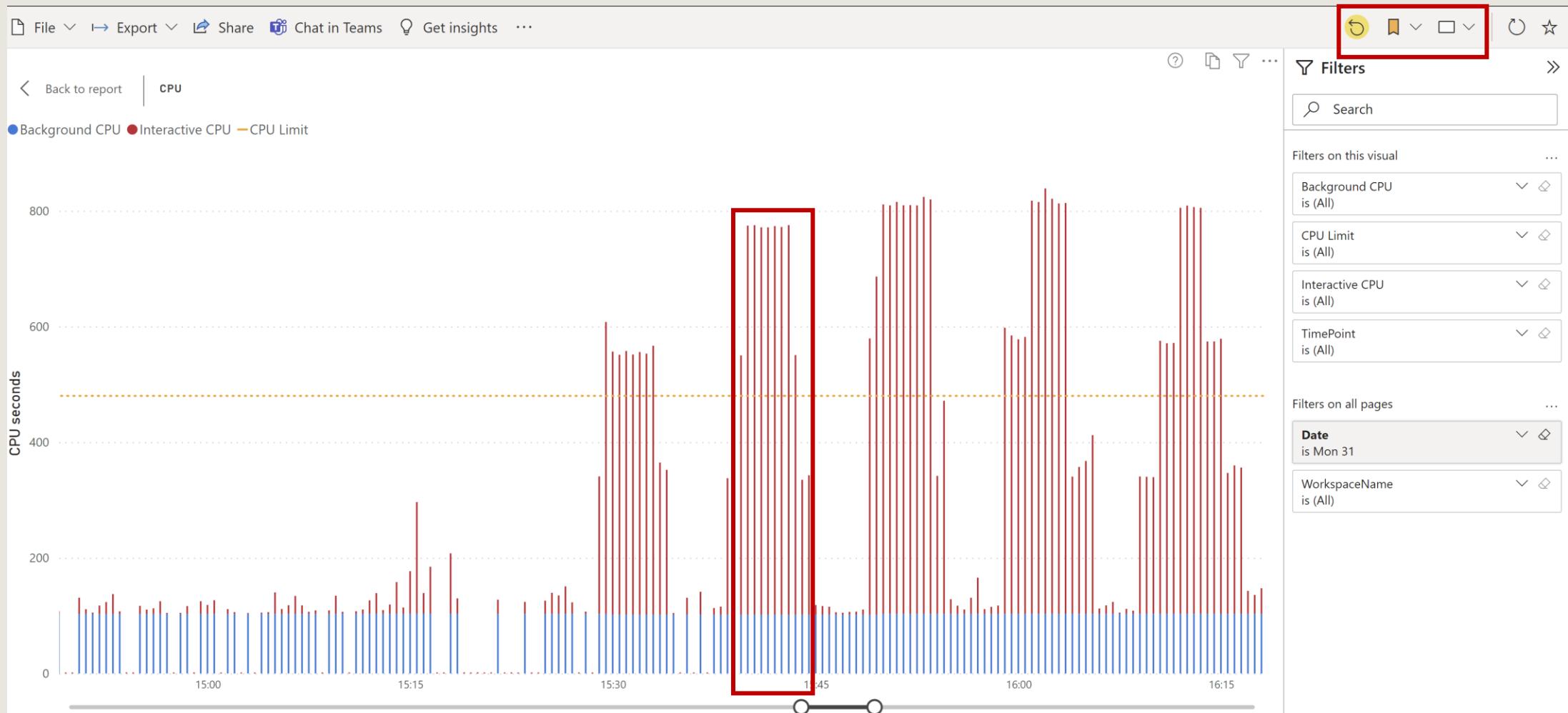
Visuals are getting more meaningful to identify the root causes

The visual for the background and interactive CPU can be zoomed



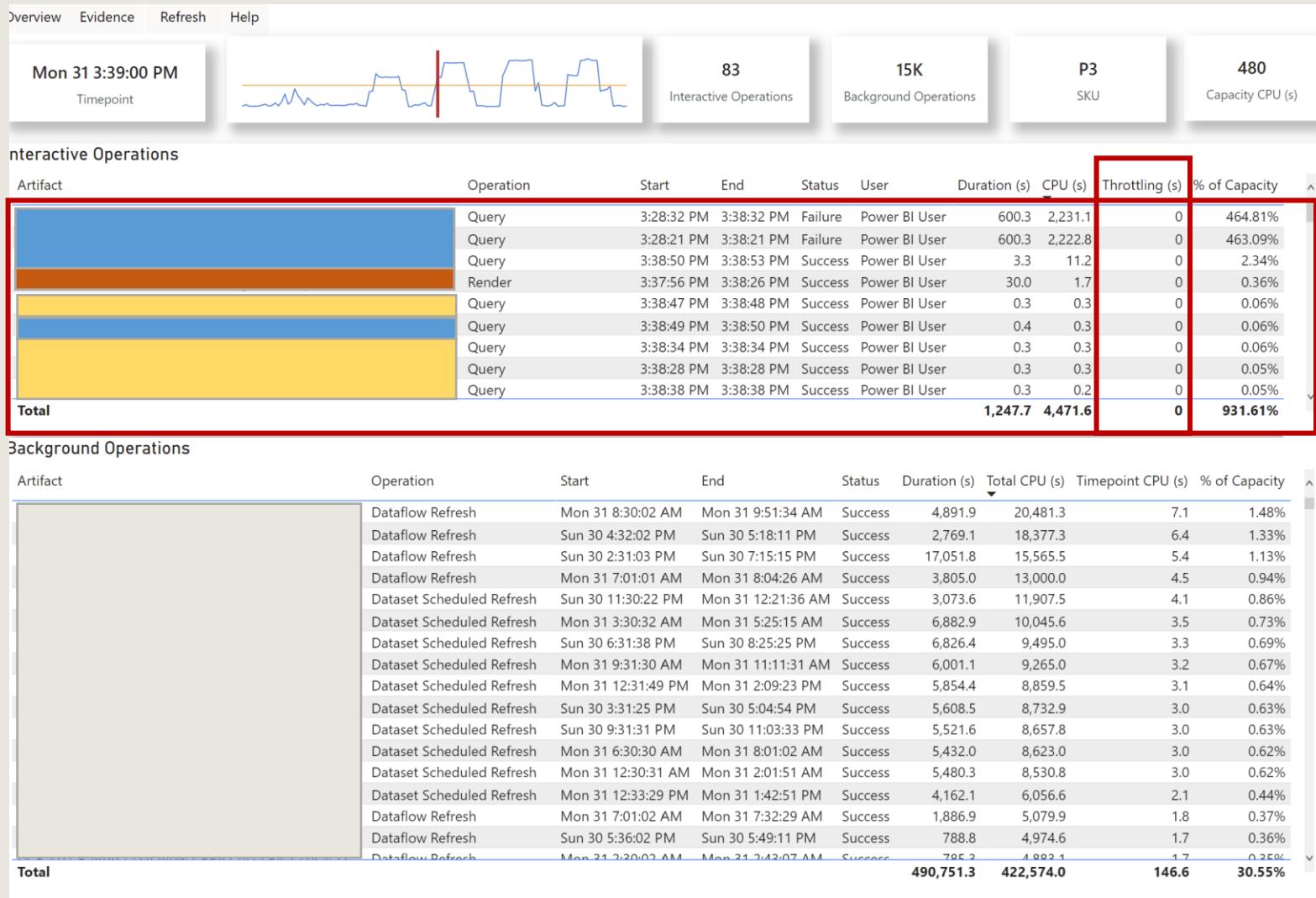
# TIMEPOINT ANALYSIS

- When going to the CPU Utilization Tab I recommend creating a personal Bookmark with this Bookmark you can open the tab multiple times and navigate to selected time window over and over again and do multiple drills to the Time Point Drill Through report
- To drill click on one of the candles and select drill through



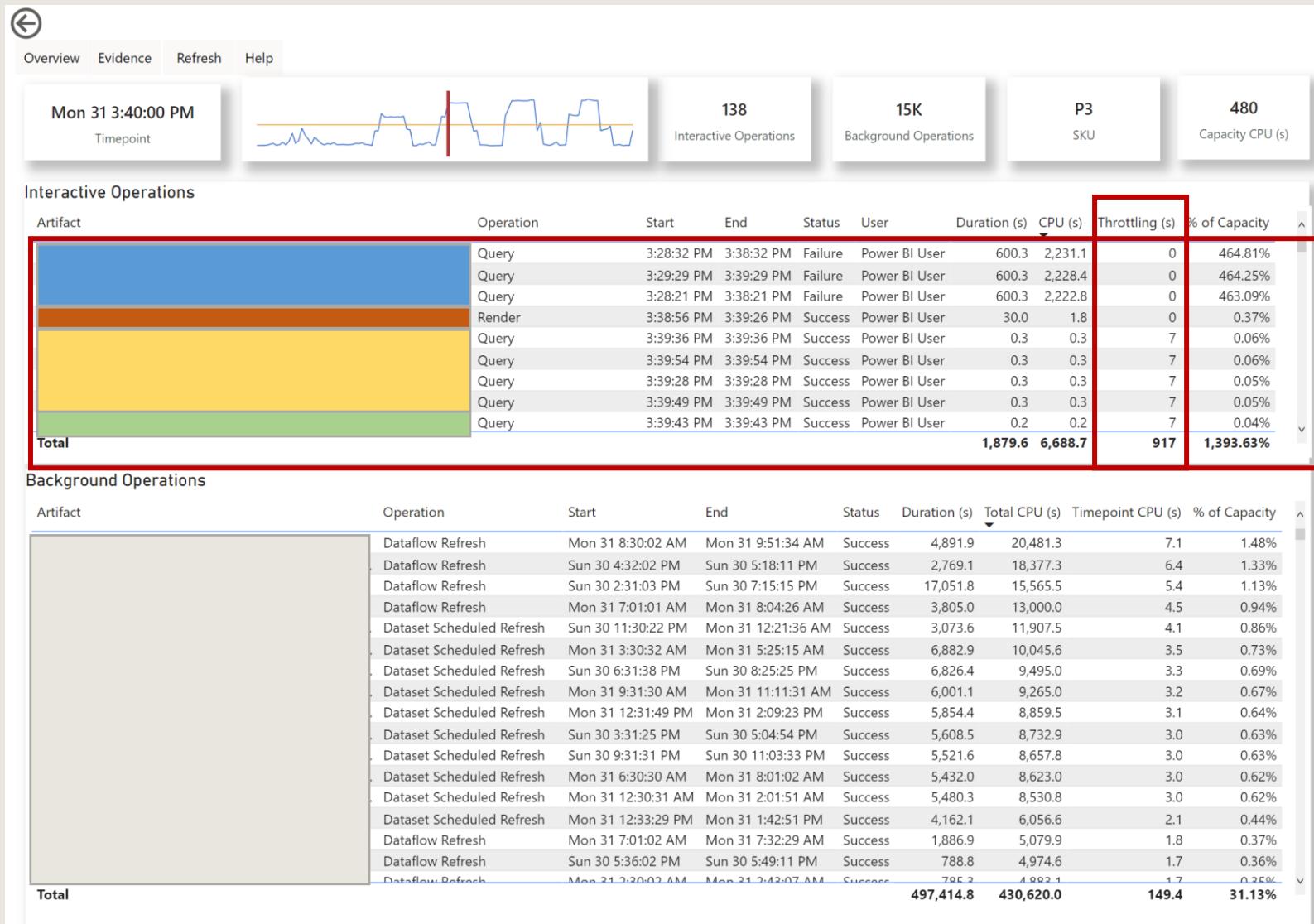
# TIMEPOINT ANALYSIS

- We see a (blue) dataset creating some overload with CPU seconds totalling up to 4453.9 from this 2 queries
- This will impact the capacity in the next time points



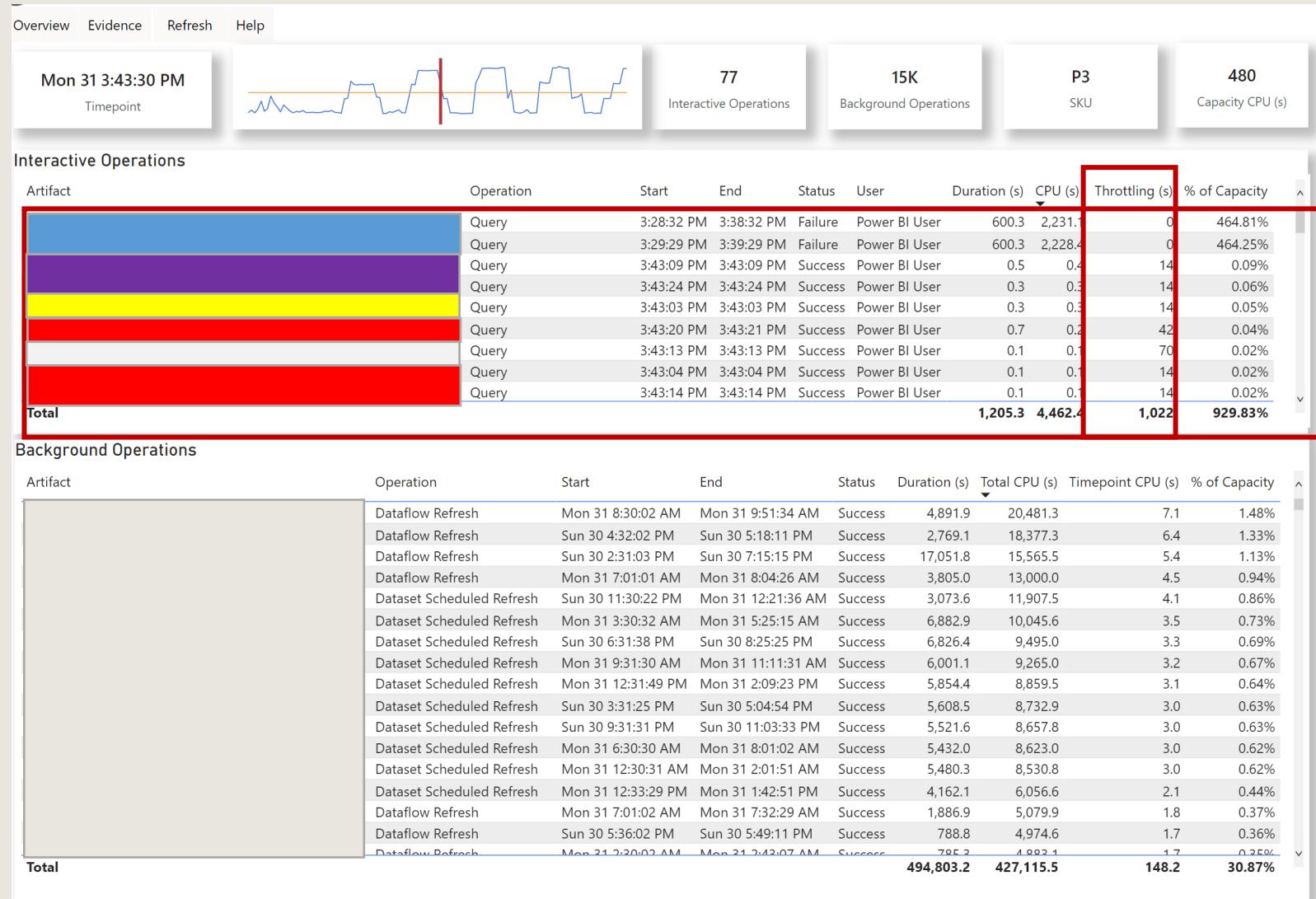
# TIMEPOINT ANALYSIS

- The impact is now in place around 130 interactive queries have been delayed in their execution.
- Each query delayed by 7 seconds totalling up @ 917 seconds



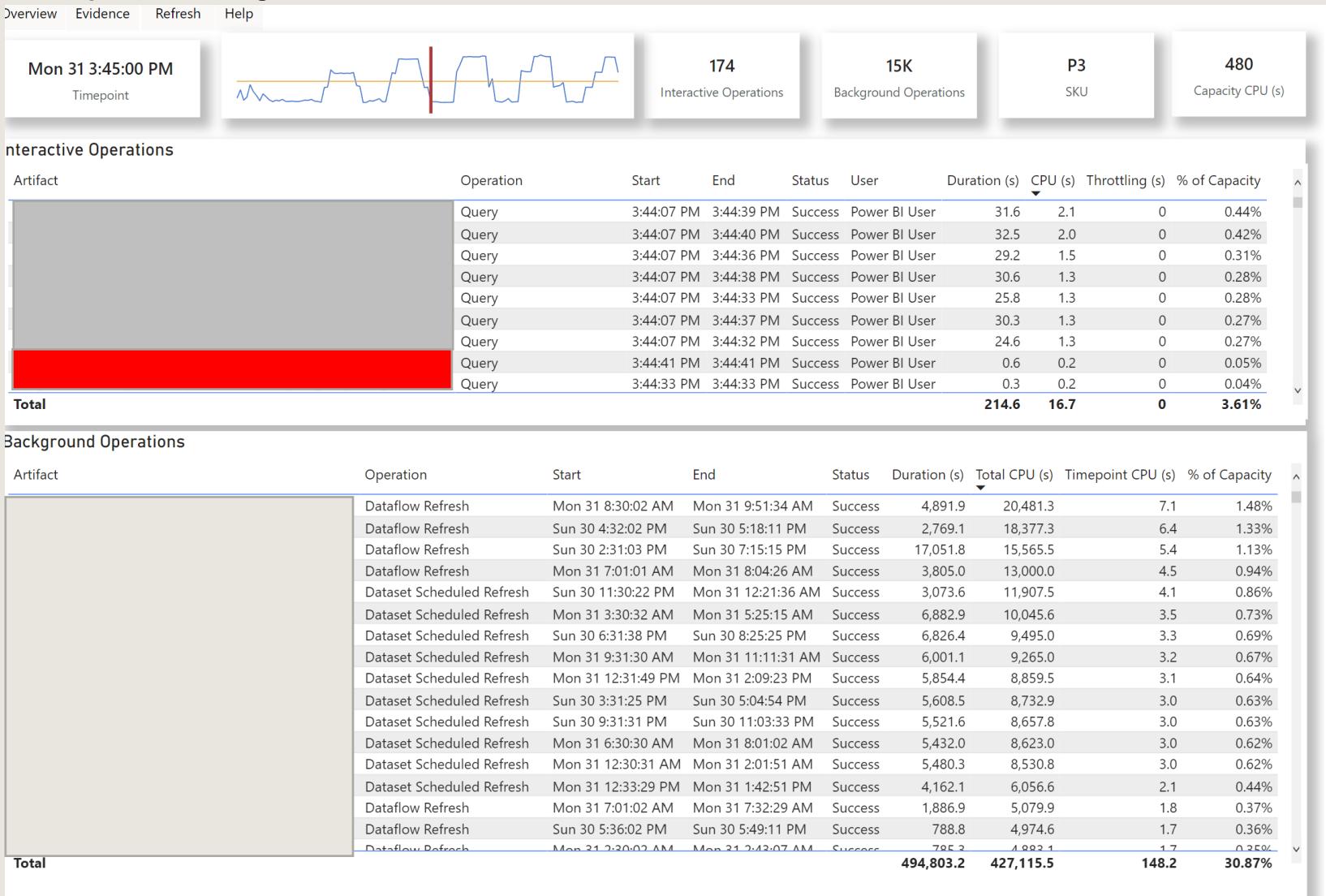
# TIMEPOINT ANALYSIS

- After 5 Minutes we still see throttling related to the 2 initial queries from 3:39:29 pm and 3:39:32pm



# TIMEPOINT ANALYSIS

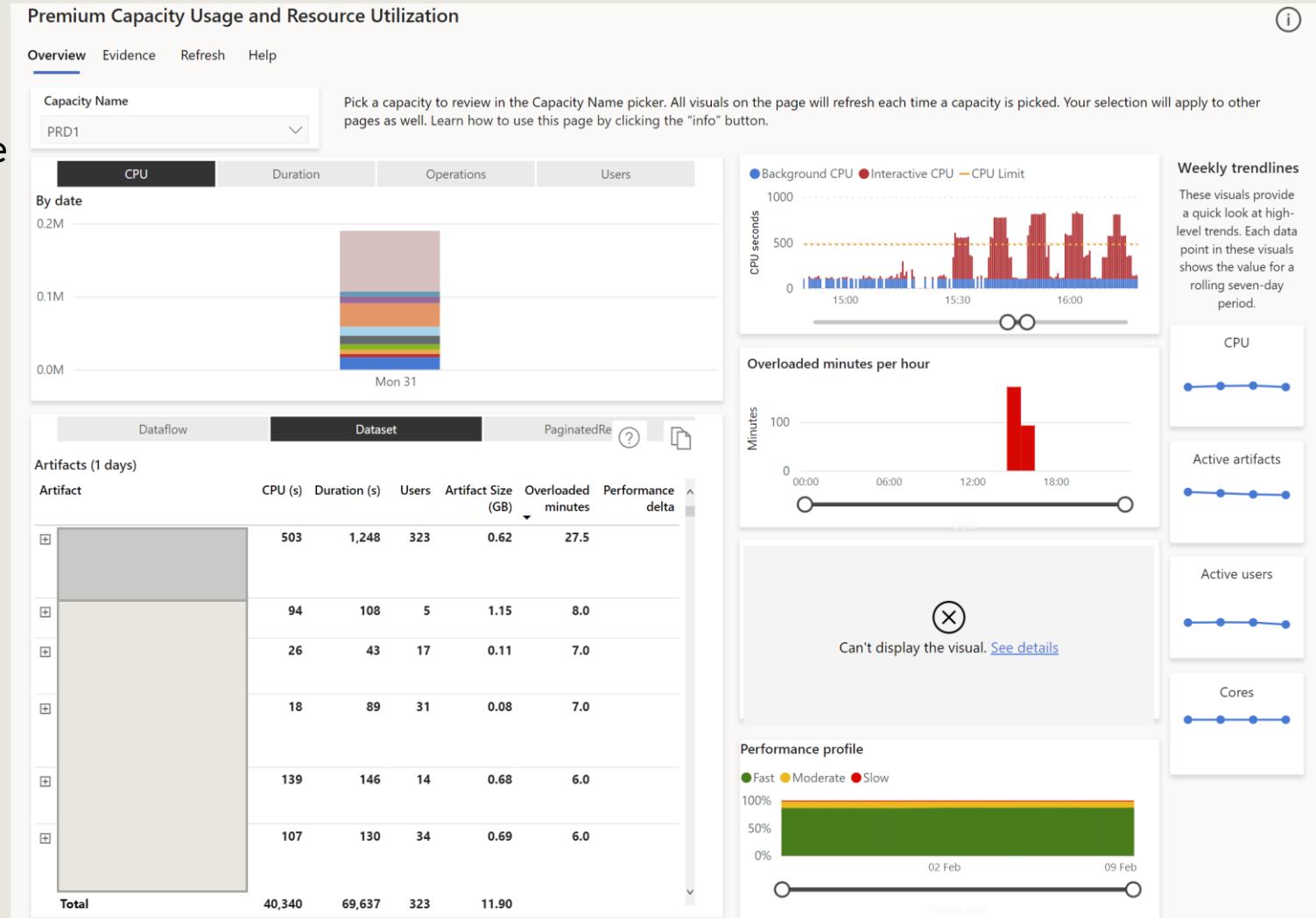
- At 3:45pm the normal situation has returned.
- Red dataset had the largest impact by throttling

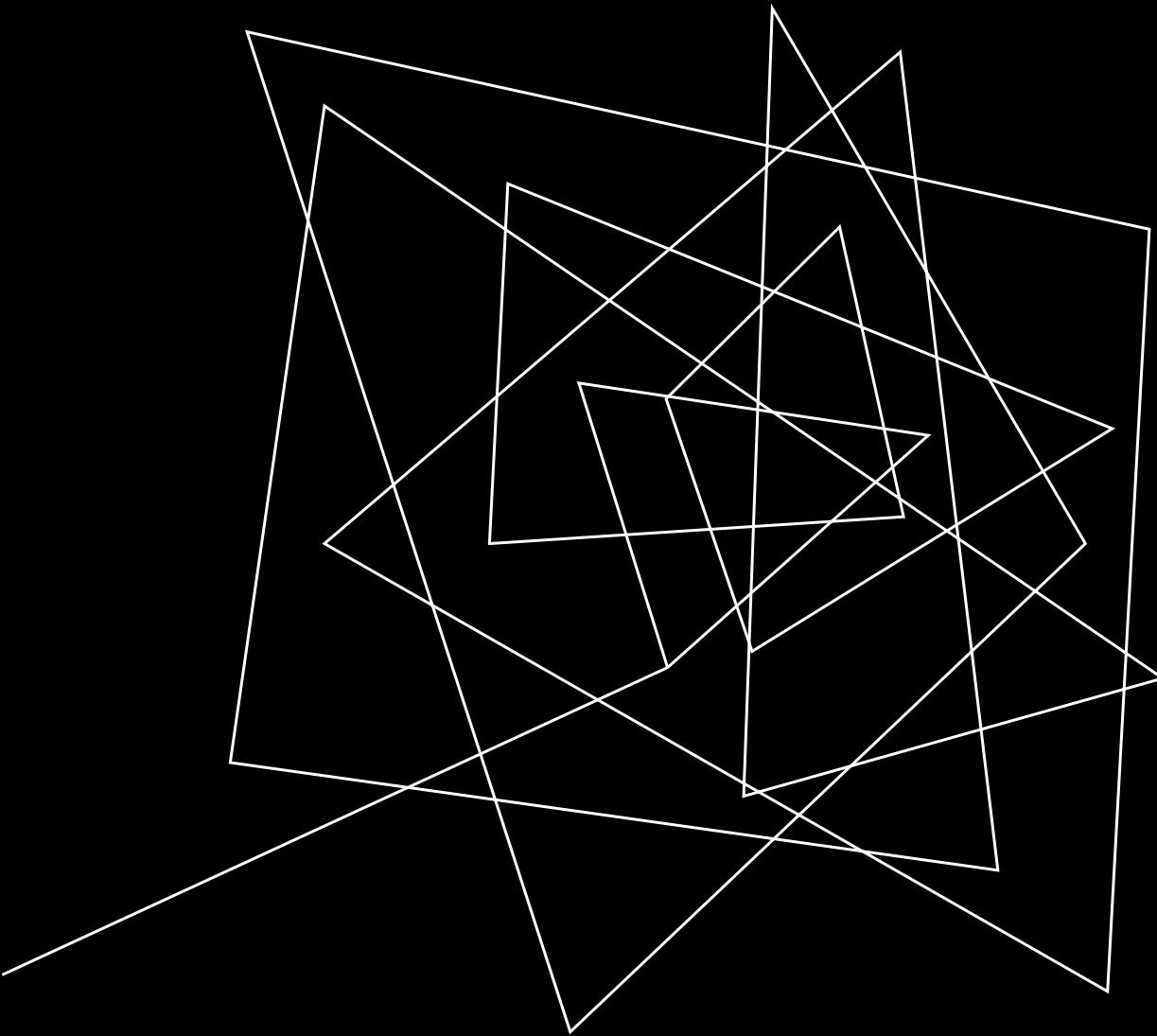


# PROACTIVE MONITORING

red dataset has been suffering from overload with an overall of 27.5 minutes

The root cause for the overloading was the blue dataset + queries





**BYOLA?!**

# BRING YOUR OWN LOG ANALYTICS

Azure Monitor Integration

Flight recorder for AS Engine events

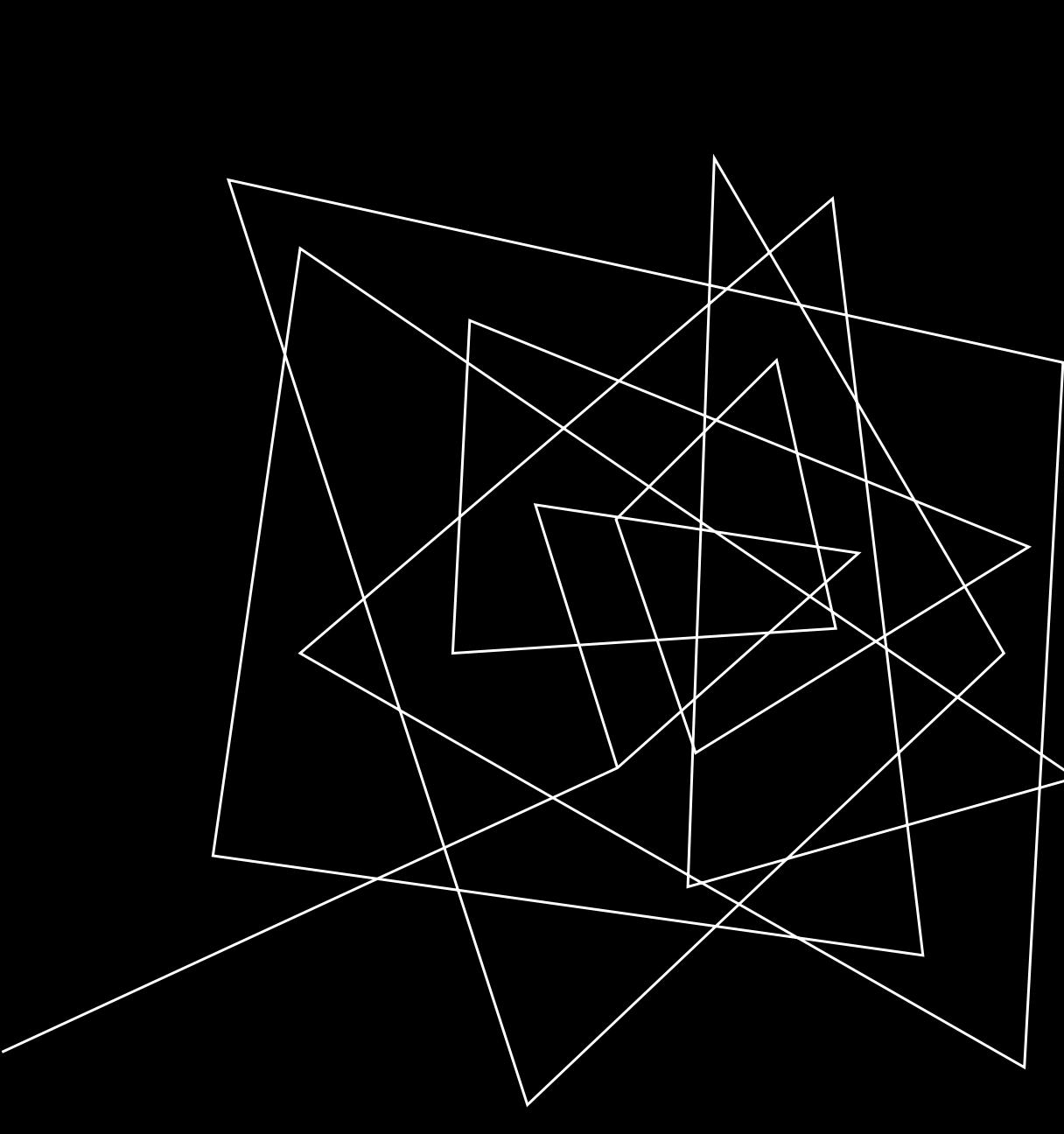
Can help you obtain:

Query Details, Users, Application

Workspace, Report, Visual, ..

Use this for deep dive investigations

[Chris Webbs' series on BYOLA](#)



# CAPACITY SETTINGS

# CAPACITY SETTINGS

## Consider your notification strategy

**TIP:** Balance information vs. alert overload

### Notifications

Get notified when you're close to exceeding your available capacity (which includes base and Autoscale v-cores).

#### Send notifications when

- You're using  % of your available capacity
- You've exceeded your available capacity and might experience slowdowns
- An Autoscale v-core has been added
- You've reached your Autoscale maximum

#### Send notifications to

- Capacity admins
- These contacts:

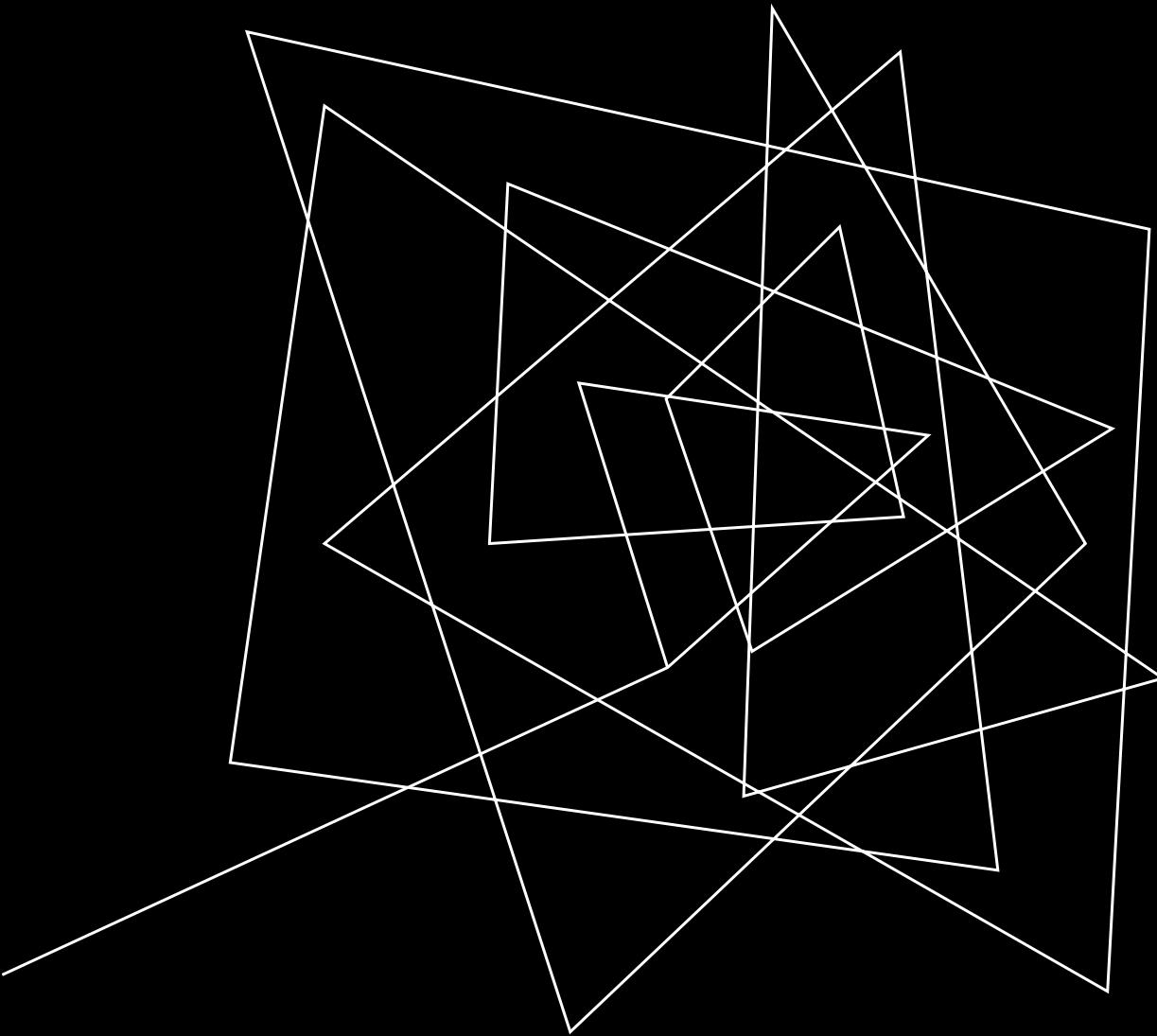
# CAPACITY WORKLOAD SETTINGS

Not all Gen 1 workload settings were transferred

Check the default capacity settings

**TIP:** Don't play around with these on a production instance

<b>AI</b>	Allow usage from Power BI Desktop
<input checked="" type="checkbox"/> On	
<b>DATASETS</b>	
Query Memory Limit (%)	<input type="text" value="0"/>
Query Timeout (seconds)	<input type="text" value="3600"/>
Max Intermediate Row Count	<input type="text" value="1000000"/>
Max Result Row Count	<input type="text" value="2147483647"/>
Max Offline Dataset Size (GB)	<input type="text" value="0"/>
Automatic page refresh	<input checked="" type="checkbox"/> On
Minimum refresh interval	<input type="text" value="1"/> Seconds ▾
Change detection measure	<input checked="" type="checkbox"/> On
Minimum execution interval	<input type="text" value="30"/> Seconds ▾
XMLA Endpoint	<input type="text" value="ReadWrite"/>



IT'S ALL ABOUT  
THE €€€

# POWER BI PRO LICENSES

TIP: Consumers don't need Power BI Pro Subscriptions

Users will not need a Power BI Pro Subscription when :

They are a viewer in an App Workspace (v2)

A member of an App Workspace App

Users will need a Power BI Pro Subscription when :

They are an Admin, Member, Contributor in any Workspace

Sharing content with other users in the organisation

Consuming content that is not hosted on Power BI Premium

# POWER BI EMBEDDED (A SKU)

A Sku has close to feature parity

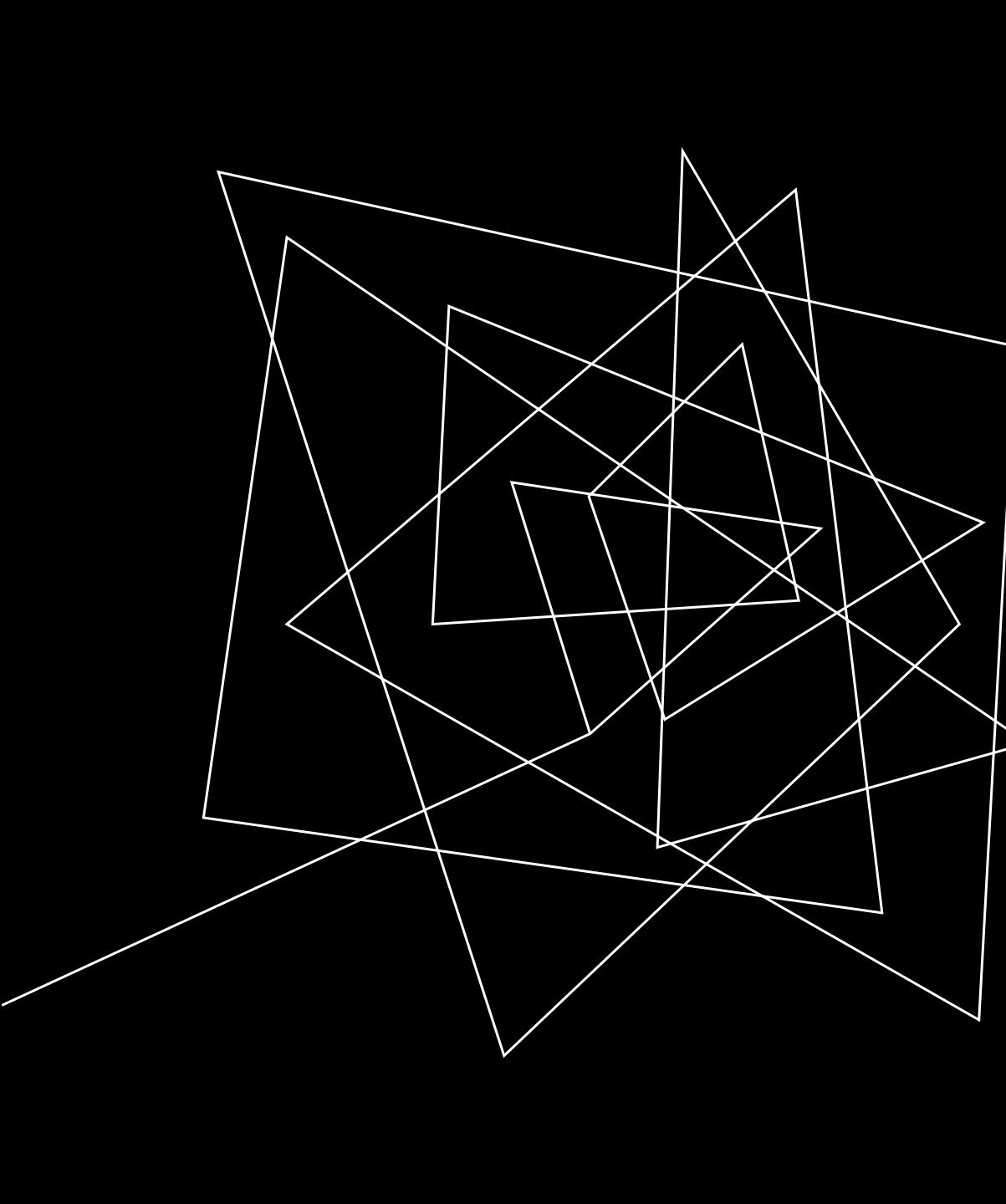
Billed by the minute to Azure Billing

Don't forget to set up Billing Alerts, Policies, and Automation

**TIP:** You can spin up A SKU to host certain 'Premium Features' when needed, to reduce usage on the P SKU

Ie. Use an A SKU for the 'DEV' and 'ACC' workspace of Deployment Pipelines

A Sku can not be used for organisational production usage



**POWER BI  
PREMIUM PER  
USER**

# PREMIUM PER USER (PPU)

PPU is a subscription based model, based on Premium Gen 2

Introduced at Ignite (H2 2020)

General Availability on April 2nd 2021

Pricing:

- 10\$ as an add-on to Power BI Pro / Office 365 E5
- 20\$ as a standalone subscription

# PREMIUM PER USER (PPU)

Access to Premium features on a per user basis

Every tenant has a PPU Capacity (P3 equivalent)

Workspaces are assigned to the Capacity

PPU Content requires every consumer to have a subscription

Aimed at smaller organisations, or offloading scenarios

# PREMIUM PER USER (PPU)

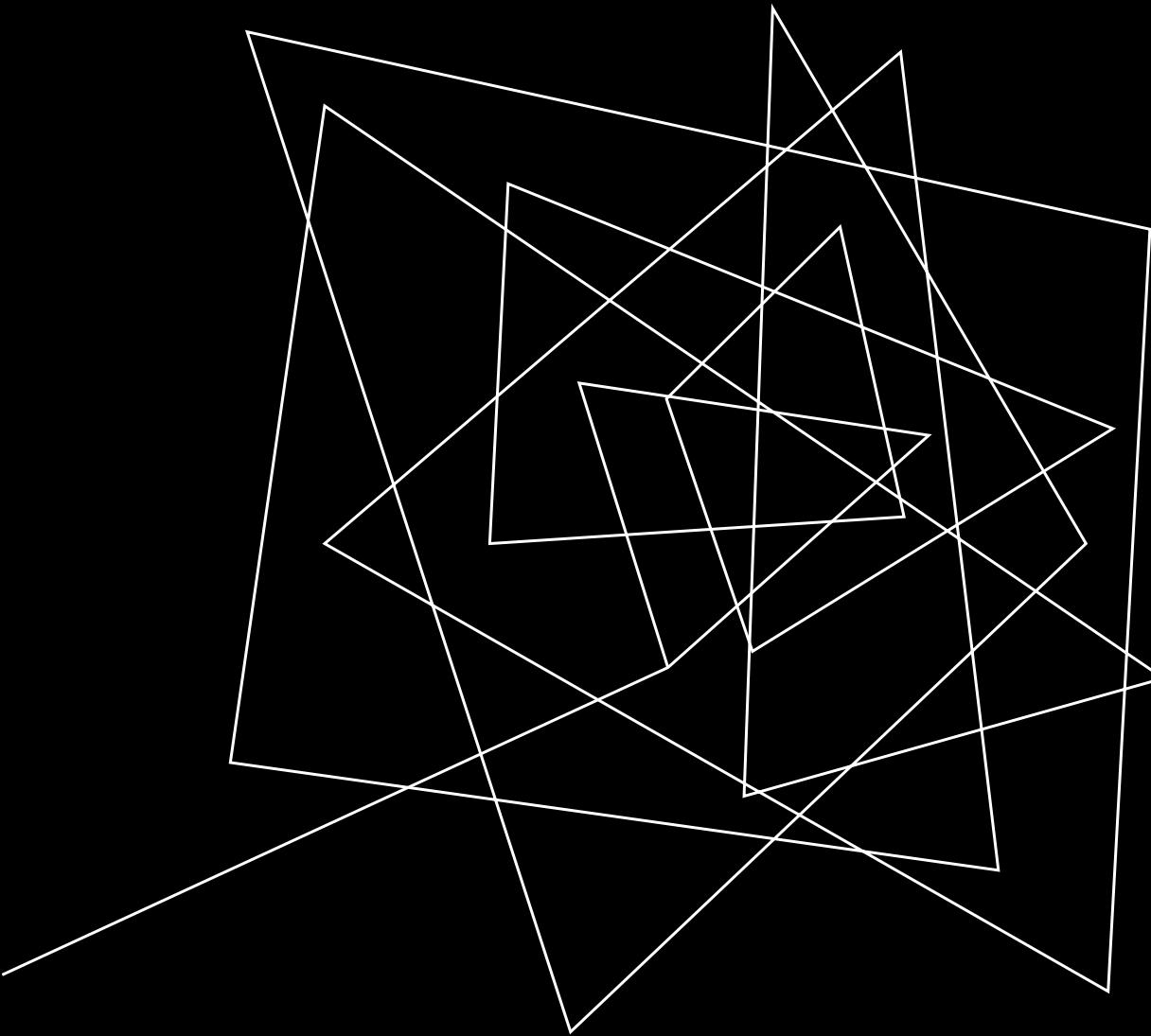
Admin portal

- Usage metrics
- Users
- Premium Per User
- Audit logs
- Tenant settings
- Capacity settings
- Refresh summary
- Embed Codes
- Organizational visuals
- Azure connections (preview)
- Workspaces
- Custom branding
- Protection metrics
- Featured content

## Premium Per User

- ▲ Auto Refresh
  - Automatic page refresh
  - On
  - Minimum refresh interval
  - 5 Minutes ▾
  - Change detection measure
  - On
  - Minimum execution interval
  - 30 Seconds ▾
- ▲ Dataset workload settings
  - XMLA Endpoint
  - Read Write ▾

**Apply** **Discard**



# TAKEAWAYS

# TAKEAWAYS

Check (and adjust) the Capacity Workload Settings

Premium Capacity Metrics App v2 is your Ops Base

Evictions are perfectly normal, don't stress

Set up auditing to have a complete overview of what's happening

Consider offload non-production workloads to A Sku / PPU

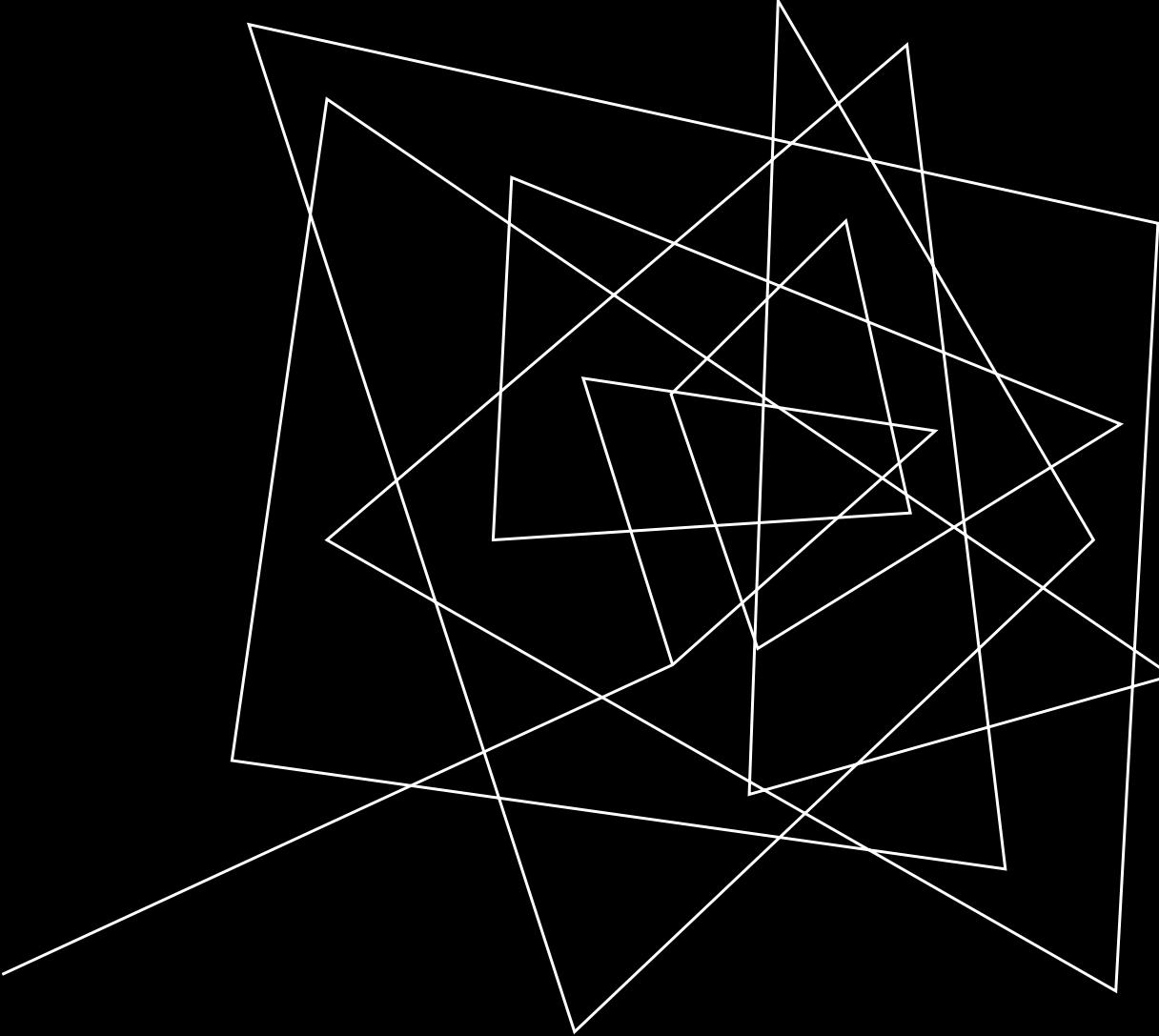
# TAKEAWAYS

Understand the shift in usage metrics (Memory -> CPU)

When using Gen 2 AutoScale, set up consumption limits

Usage Patterns are still key, even though the need is less pressing

Leverage BYOLA for in-depth analysis



# REFERENCES

# RESOURCES

<https://docs.microsoft.com/en-us/power-bi/admin/service-premium-gen2-what-is>

<https://docs.microsoft.com/en-us/power-bi/admin/service-premium-transition-gen1-to-gen2>

<https://docs.microsoft.com/en-us/power-bi/admin/service-premium-architecture>

<https://docs.microsoft.com/en-us/power-bi/admin/service-premium-concepts>

# RESOURCES

<https://docs.microsoft.com/en-us/power-bi/admin/service-premium-capacity-manage-gen2>

<https://docs.microsoft.com/en-us/power-bi/admin/service-premium-auto-scale>

<https://docs.microsoft.com/en-us/power-bi/admin/service-premium-install-gen2-app?tabs=1st>

<https://docs.microsoft.com/en-us/power-bi/admin/service-premium-gen2-metrics-app>

# RESOURCES

<https://docs.microsoft.com/en-us/power-bi/admin/service-premium-gen2-faq>

<https://docs.microsoft.com/en-us/power-bi/admin/service-premium-per-user-faq>

# RESOURCES

[Do we need more Power BI Premium Capacity?](#)

[Power BI Premium Gen 2 Updates \(January 2022\)](#)

[Making Sense of the Power BI Premium Gen 2 Metrics App](#)

[The Power BI Premium Video you need to watch .. probably \(Oct 2021\)](#)

# WHO AM I



Power BI CAT

**dataMinds.be** Member



@BenniDeJagere



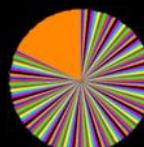
/bennidejagere



/bennidejagere



/bennidejagere



#SayNoToPieCharts



**SLIDES CAN BE FOUND AT :**

[https://github.com/BenniDeJagere/Presentations  
/{Year}/{Date}\\_{Event}](https://github.com/BenniDeJagere/Presentations/{Year}/{Date}_{Event})

