Microsoft Fabric

Microsoft



Demystifying Capacity Metrics

Daan Humblé

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Agenda

- What are capacities
- How do capacities work
- Capacity Metrics App
- Tips & Tricks



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Note: I am speaking on my own behalf. There is a separation between my speaking and my professional responsibilities at my employer. My presentation has not been approved by Microsoft and the statements and views expressed are mine and mine alone. My position at Microsoft permits me speaking as prescribed above.















Additional Fabric SKUs



A shared capacity that provides a set of capacity units (CUs) powering the compute for Data Warehouse, Data Integration, Data Science, Data Engineering, Real-Time Analytics, Power BI, Data Activator, and Copilot.



Compute Power

Capacity units (CUs) = Compute power

Capacity units (CUs) are units of measure that represent a pool of compute power needed. Compute power is required to run queries, jobs, or tasks.



Consumption

Capacity units (CUs) = Compute power

Capacity units (CUs) are units of measure that represent a pool of compute power needed. Compute power is required to run queries, jobs, or tasks.

CU Consumption

The CU consumption is highly correlated to the underlying compute effort needed for the tasks performed by the capability during the processing time.

Each capability, such as Power BI, Spark, Data Warehouse, with the associated queries, jobs, or tasks has a unique consumption rate.

The inner-workings of your capacity Two types of activities

Interactive

(DAX) Queries XMLA Endpoint

Background

Dataset refreshes Dataflow refreshes

Lakehouse Notebooks Real Time Analytics Copilot The inner-workings of your capacity













Carry Forward



Carry Forward





What happens if there isn't enough?

Approaching the limit

Warning & emails to capacity admins

Exceeding the limit 10 minutes future capacity = interactive delay 60 minutes future capacity = interactive rejection 24 hours future capacity = background rejection

Remedy an overload

Reduce consumption Upgrade Wait Pause the capacity

Unable to load model due to reaching capacity limits

Unable to open this report because your organization's compute capacity has exceeded its limits. Try again later. Please check the technical details for more information. If you contact support, please provide these details. See details ~

Learn more about capacity limits

Close

 \times



Demo

F2 vs F64



Demo (results)

_					
	istory .	- Sciver i	innigs		
	Cache	Statistic	TotalDuration	SE Duration	
	Cold	Average	7.057,00	0,00	
	Cold	StdDev	145,94	0,00	
	Cold	Min	6.844,00	0,00	
	Cold	Max	7.237,00	0,00	
	Warm	Average	6.991,80	0,00	
	Warm	StdDev	406,63	0,00	
	Warm	Min	6.643,00	0,00	
	Warm	Max	7.563,00	0,00	

F2

		7		
Cache	Statistic	TotalDuration	SE Duration	
Cold	Average	6.884,80	0,00	
Cold	StdDev	372,23	0,00	
Cold	Min	6.594,00	0,00	
Cold	Max	7.500,00	0,00	
Warm	Average	7.325,40	0,00	
Warm	StdDev	331,66	0,00	
Warm	Min	7.047,00	0,00	
Warm	Max	7.860,00	0,00	

F64

Monitor your capacity in the capacity metrics app

- Tenant wide visibility into capacity usage for all Fabric workloads in one place
- Identify resource usage trends across artifacts and operations
- Monitor the impact of throttling to user experience to make scale-up decisions
- View preview usage in parallel with production workloads to make datadriven capacity sizing decisions



Select item kind(s):	All	\sim	Select optional column(s):	Multiple selections	\sim
Items (14 days)					

Item	CU (s)	Duration (s)	Users	Item size (GB)	Overloaded minutes	Billing type
wenrui_workspace \ SynapseNotebook \ Notebook 1	459,581.49	114,753.04	1		98.15	Billable
Fabric Real-time tutorial \ EventStream \ Something2	280,986.39	3,630,600.00	1		0.00	Billable
Fabric Real-time tutorial \ EventStream \ NyTaxiTripsEventstream	277,905.03	3,632,400.00	1		0.00	Billable
Fabric Real-time tutorial \ EventStream \ Something	274,940.68	3,632,400.00	1		0.00	Billable
Fabric Real-time tutorial \ EventStream \ SarinaStream	274,930.72	3,632,400.00	1		0.00	Billable
Fabric Real-time tutorial \ KustoDatabase \ NycTaxiDB	246,870.00	795,154.73	2		0.00	Billable
PBI Astronauts \ Dataset \ TeamAnalytics	200,439.87	12,900.67	4	0.88	0.00	Billable
ICM_Routing_App \ Dataset \ ICM Routing App	183,670.48	13,083.99	349	0.84	0.00	Billable
PBI Astronauts \ Dataset \ Saastronauts DevOps	172,661.06	8,600.50	3	0.01	0.00	Billable
Compliance Insights WW \ Dataset \ CI_Dashboard	96,910.98	3,729.17	108	0.28	0.00	Billable
VBD Hub \ Dataset \ VBD - Accreditations	75,056.14	42,655.97	192	0.89	0.00	Billable
Compliance Insights MAN \ Dataset \ EGRC Audit Issues	71 /08 6/	2 604 51	25	0.21	0.00	Rillahla

Investigate usage in the Timepoint-details

- Zoom in to analyze workload operations and artifacts with full fidelity down to 30 second granularity
- View the impact of long-running jobs against capacity limits with smoothing applied
- Realtime visibility of in progress operations
- Analyze user experience to efficiently scale and optimize

Timepoint CU %	6 t		~~~			Interactiv	ve operations	Backgrou	nd operation	ns	SKU		CU (s)
nteractive operations													
Item	Operation	Start	End		Status	User		Duration (s) 1	otal CU (s) T	imepoint CU (s)	Throttling (s)	% of Base Capacit	y Billing type
PII:H108(Kfs55i54jsgEMmrhTa4RyAlKlFfrJK8Ji/K/lQI0II	Query	8/30/2023 6:53:20	. 8/30/202	3 6:53:31	Success	{PII:H108	(ULOckiHdFDN	I 10	951	29.74	0	49.579	6 Billable
(PII:H108(Kfs55i54jsgEMmrhTa4RyAlKIFfrJK8Ji/K/IQI0II	Query	8/30/2023 6:50:09.	. 8/30/202	3 6:50:47	Success	{PII:H108	(ULOckiHdFDN	l 37	978	29.64	0	49.399	6 Billable
(PII:H108(Kfs55i54jsgEMmrhTa4RyAlKIFfrJK8Ji/K/IQI0II	Query	8/30/2023 6:56:48	. 8/30/202	3 6:57:05	Success	{PII:H108	(ULOckiHdFDN	l 17	208	20.80	0	34.679	6 Billable
(PII:H108(Kfs55i54jsgEMmrhTa4RyAlKIFfrJK8Ji/K/IQI0II	Query	8/30/2023 6:57:32	. 8/30/202	3 6:57:45	Success	{PII:H108	(ULOckiHdFDN	l 13	204	20.40	0	34.009	6 Billable
{PII:H108(Kfs55i54jsgEMmrhTa4RyAlKIFfrJK8Ji/K/IQI0II	Query	8/30/2023 6:57:13.	. 8/30/202	3 6:57:26	Success	{PII:H108	(ULOckiHdFDN	l 13	202	20.20	0	33.679	6 Billable
PII:H108(Kfs55i54jsgEMmrhTa4RyAlKlFfrJK8Ji/K/lQI0II	Query	8/30/2023 6:54:17	. 8/30/202	3 6:54:30	Success	{PII:H108	(ULOckiHdFDN	l 13	201	20.12	0	33.549	6 Billable
(PII:H108(Kfs55i54jsgEMmrhTa4RyAlKIFfrJK8Ji/K/IQI0II	Query	8/30/2023 6:55:23.	. 8/30/202	3 6:55:38	Success	{PII:H108	(ULOckiHdFDN	l 14	200	20.05	0	33.429	6 Billable
{PII:H108(Kfs55i54jsgEMmrhTa4RyAlKIFfrJK8Ji/K/IQI0II	Query	8/30/2023 6:56:17.	. 8/30/202	3 6:56:30	Success	{PII:H108	(ULOckiHdFDN	l 12	200	20.05	0	33.429	6 Billable
{PII:H108(Kfs55i54jsgEMmrhTa4RyAlKIFfrJK8Ji/K/IQI0II	Query	8/30/2023 6:54:46.	. 8/30/202	3 6:54:59	Success	{PII:H108	(ULOckiHdFDN	l 12	198	19.80	0	33.009	6 Billable
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Total									328	.890 373,91	3 13	0.79	0 2
urndown table					(Overage	S					10 mins 60 m	ins 24 hrs
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DMS			0.00	0.00	%	Ove	11.1111111111						
FS			0.00	0.00	%	2					lillin.		
AS DMS ES		52,	065.00 0.00 0.00	% 173550 0.00 0.00	.00% % %	rry Over %							

OneLake Storage

	<u>.</u>								
5 Workspaces	29.42 Current storage (GB)	14.35 Billable storage (GB)							
Top 10 workspaces by	billable storage (GB)	%							Top: 10
Workspace name	Workspace Id		Operation name	Deletion status	Billing type	Current storage (GB)	Billable Storage (GB)		Billable storage %
Data Ingestion	061B0678-8ADD-45	54-8DD6-521D54AEF0DF	OneLake Storage	Active	Billable	27.81		13.09	91.28%
Capacity Metrics Deepdive [Dev]] 3990FA30-5ADB-40	E4-B2FF-F10BD2E5514B	OneLake Storage	Active	Billable	1.07	•	1.07	7.43%
Moving Data Around	886A83FA-3CCF-459	9F-AD05-7CFB52163A83	OneLake Storage	Active	Billable	0.47		0.11	0.74%
What the Hack [Dev]	B0B3A52D-1189-42	3F-8048-A4A43A108F82	OneLake Storage	Active	Billable	0.07		0.08	0.54%
Contoso Sales Reporting	FBF1B1F6-6598-499	9-AE71-86AC1AA754E4	OneLake Storage	Active	Billable	0.00		0.00	0.01%



Tips & Tricks

Remedy an overload by reducing consumption

Interactive

Star Schema! Improve DAX Reduce number of visuals Use aggregations Consult heavy user

Background

Star Schema! Reduce manual refreshes Incremental refresh Aggregations

Remedy an overload by pausing the capacity



Guardrails

Notifications:

Power BI Workloads:

- Query Memory Limit (%)
- Query Timeout

Other workloads:

- Warehouse
- Spark pools

Δ	Notifications
	Send notifications when
	You're using % of your available capacity
	You've exceeded your available capacity and might experience slowdowns
	Send notifications to
	Capacity admins
	These contacts:
	Enter email addresses
	Apply Discard

Isolate heavy workloads



Ideal set-up*?



*) for Power BI usage

(Load) testing

microsoft / PowerBI-Tools-For	A Notifications	೪ Fork 93	☆ Star 133		
<> Code ① Issues 27 第 Pull requ	iests 3 🕟 Actions 🖽 Projects 🕕 Security 🗠 Insights				
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🕒 PBIToken.json	filters, clicking bookmarks, and simulating user "think time" will use this Realistic Load Test Tool.	nere a user studies	the report befor	e clicking again,	
Power BI Load Testing Demo.pbix					
🗅 Readme.md	Change Log				
RealisticLoadTest.html	• 8/1/2019 - Initial check-in containing the following enhan	cements to the ori	ginal LoadTestin	gPowerShellToo	1
Run_Load_Test_Only.ps1	code:	ndomly cycling thr	ough filter comb	inations to achie	
Setup_Load_Test.ps1	cold cache load tests	idonity cycling third	agir inter combi		eve
Update_Token_Only.ps1	 Support for text and integer report-level filters 				
> 🖿 doc_images	 Support for text and integer slicers 				
	 Support for specifying the report page to display. 				

More detailed monitoring



PBI Monitor

GitHub - RuiRomano/pbimonitor

GitHub - microsoft/PowerBI-LogAnalytics

Log Analytics

Wrap up

Plan for the average usage Keep grip with the Metrics App

Optimize Optimize Optimize



Session evaluation



Event evaluation

