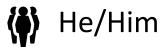




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Found in Kentucky, USA

Blogger/Tweeter

Community Junkie

Microsoft Data Platform MVP

VMWare vExpert

Basically, a Nerd

Denny Cherry & Associates



Certified IT professionals to help achieve IT goals

Clients ranging from small business to Fortune 10 corporations

Help save on costs while improving IT reliability and solving challenges





My Slides & Demos



https://bit.ly/mypresentationfiles







Strategic Partner





Agenda



What is IQP?

Challenges

Table Deferred Compilation

Parameter Sensitive Plans

Degree of Parallelism Feedback

Demos



Artist Formerly Known As

Adaptive Query Processing





CHALLENGE ACCEPTED



Lightweight Query Profiling

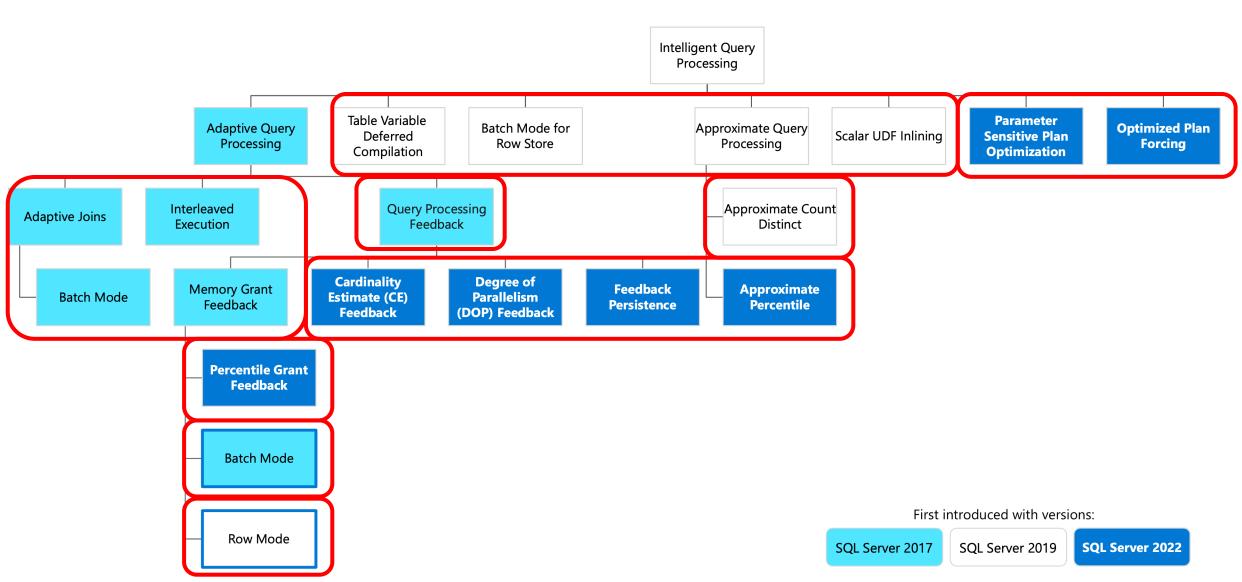
Provides framework for performance improvements

< SQL Server 2019 = Opted In

Query Store utilized in most cases



SQL Server 2022 IQP



https://learn.microsoft.com/en-us/sql/relational-databases/performance/intelligent-query-processing?view=sql-server-ver16



>>> COMPATIBILITY LEVEL

DMVs



Query Inflight - 2016 SP1 or higher

sys.dm_exec_query_statistics_xml(sessionID)

Query Completion – 2019+

sys.dm_exec_query_plan_stats(plan_handle)

LAST_QUERY_PLAN_STATS





Table Variable Deferred Compilation

Table Variables Issues

@table.objectid



Latiniated addition cost	0.0052051
Number of Executions	1
Estimated Number of Executions	1
Estimated Number of Rows to be Read	1
Estimated Number of Rows Per Execution	1
Estimated Row Size	15 B
Actual Rebinds	0
Actual Rewinds	0
Ordered	False
Node ID	4
Object [@table] [a] Output List	

Table Variable Deferred Compilation



< SQL Server 2019 = 1 row fixed estimate

Too many rows = bad execution plan

Temporary Table vs Table Variable

Table Variable Deferred Compilation



Compilation is shifted to first actual execution of a statement

Utilizes actual cardinality vs wild guess

Mimics temporary table behavior



Parameter Sensitive Plan

Parameter Sensitive Plan



Helps solve parameter sniffing issues

Parameter sniffing issues is not bad; it's working as designed

Only works on equality predicates

Cardinality values are divided into three predicate "buckets" via Dispatcher.



Parameter Sensitive Plan



Uses High, Medium, Low predicate boundary values

Child queries are then compiled and executed generating query variants. They have their own execution plan in Query Store.

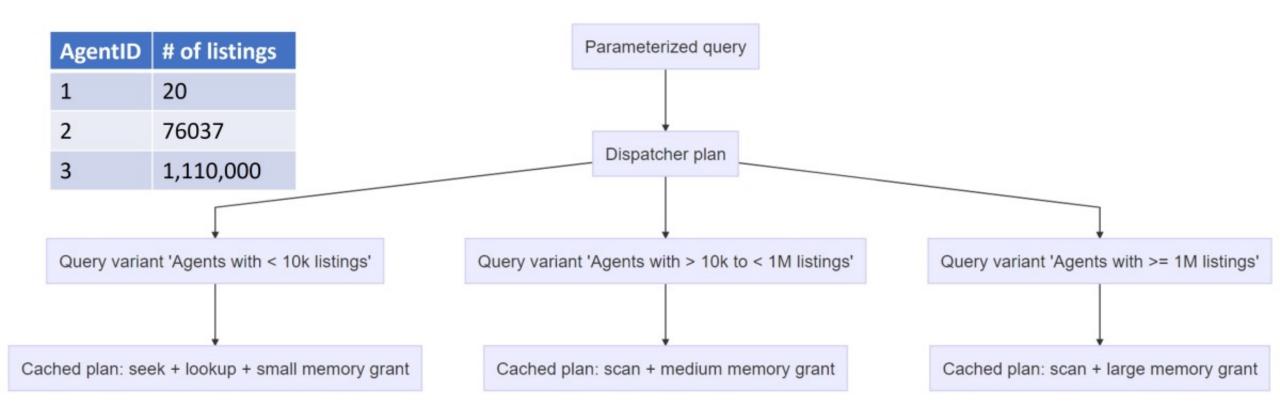
Dispatcher plans are recompiled after large data distribution changes

Variant plans will recompile independently



Parameter Sensitive Plan







Sys.query_store_plan Sys.query_store_query_variant



Degree of Parallelism Feedback

DOP Feedback



Uses elapsed time and waits to identify inefficient parallelism for repeating queries

Query store is required

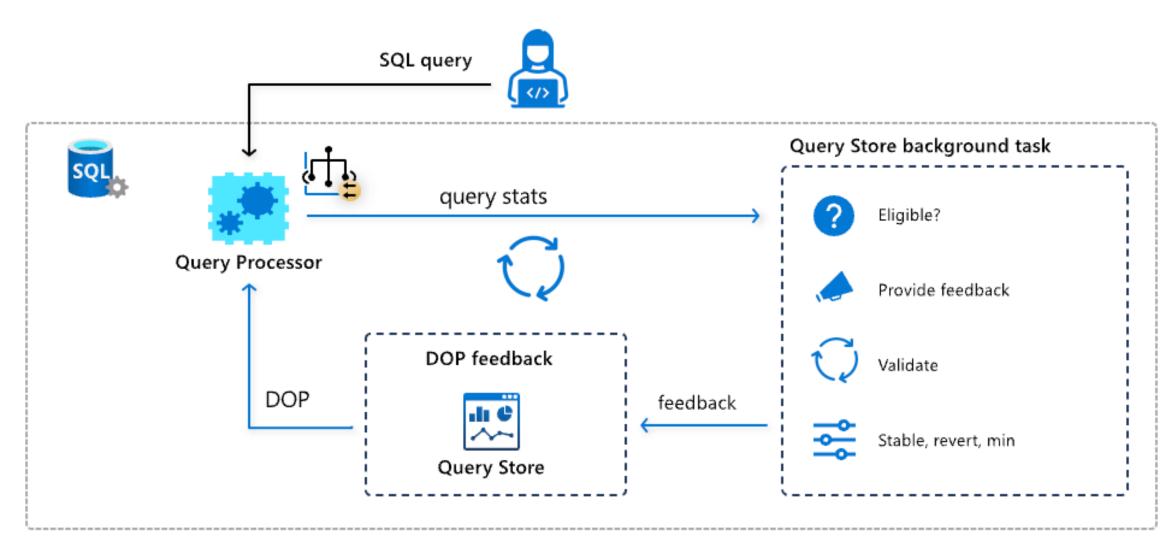
Plan regression = last known good DOP

Honors Plan forcing



DOP Feedback Architecture





https://aka.ms/sqlserver2022decks

DOP Feedback



Won't rotate up unless reverting

DOP of 2 is the minimum value

Query Hints will be the new ceiling limit if > 2

DOP Feedback is Replica aware



DEMO

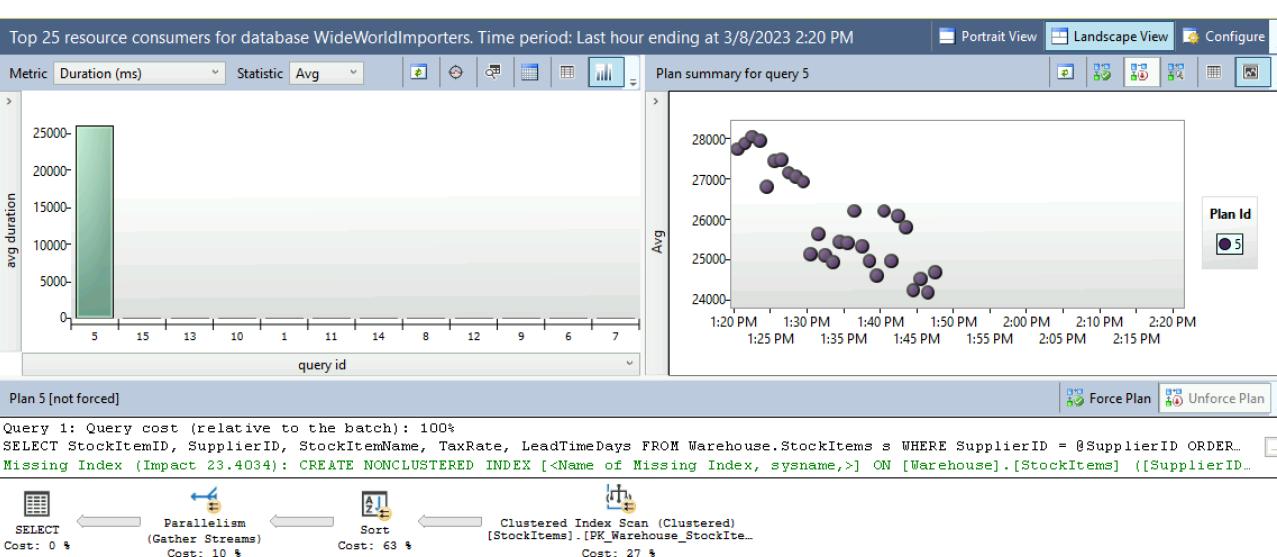


Displaying 16 Events

	name	timestamp	feedback_dop	query_dop
•	dop_feedback_eligible_query	2023-03-08 13:16:55.7877502	NULL	16
	dop_feedback_provided	2023-03-08 13:23:30.4246819	12	16
	dop_feedback_validation	2023-03-08 13:23:58.8934144	12	NULL
	dop_feedback_validation	2023-03-08 13:24:26.7528532	12	NULL
	dop_feedback_validation	2023-03-08 13:28:58.6556280	12	NULL
	dop_feedback_provided	2023-03-08 13:29:26.7178994	8	12
	dop_feedback_validation	2023-03-08 13:29:52.5435216	8	NULL
	dop_feedback_validation	2023-03-08 13:31:34.9902149	8	NULL
	dop_feedback_validation	2023-03-08 13:35:47.0307650	8	NULL
	dop_feedback_provided	2023-03-08 13:36:13.8242589	6	8
	dop_feedback_validation	2023-03-08 13:36:39.4556774	6	NULL
	dop_feedback_validation	2023-03-08 13:38:20.4270055	6	NULL
	dop_feedback_validation	2023-03-08 13:42:35.0200419	6	NULL
	dop_feedback_provided	2023-03-08 13:42:59.9480367	4	6
	dop_feedback_validation	2023-03-08 13:43:24.4562714	4	NULL
	dop_feedback_validation	2023-03-08 13:45:04.2911374	4	NULL

Duration

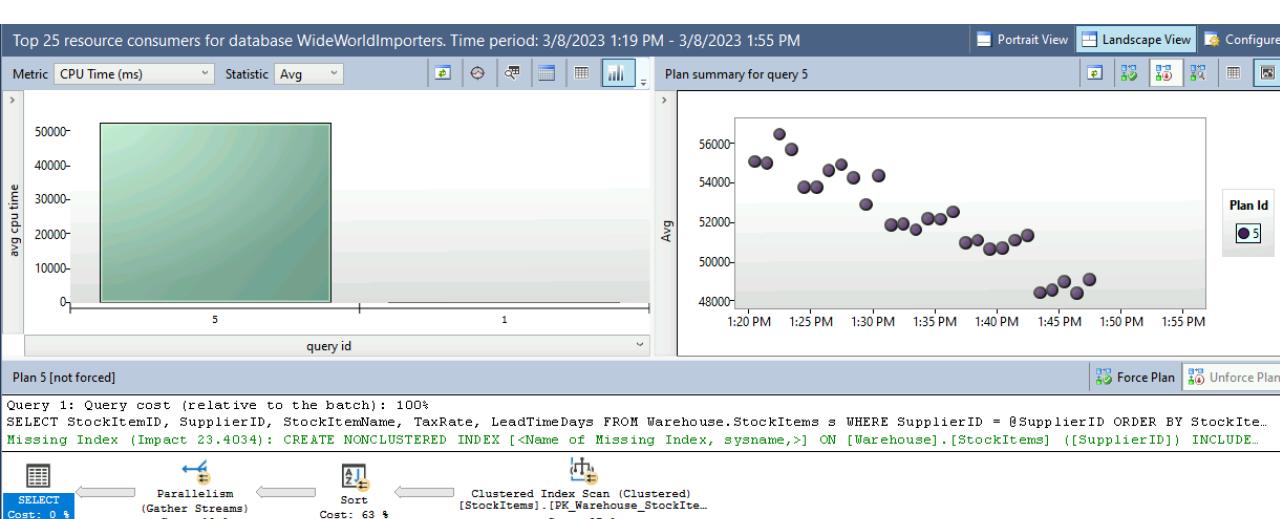




CPU Time

Cost: 10 %





Cost: 27 %

Feature Availability



Feature	Enterprise	Standard
Table Variable Deferred Compilation	Yes	Yes
Parameter Sensitive Plan	Yes	Yes
Degrees of Parallelism Feedback*	Yes	No

Summary



Performance Game Changer

Compatibility Levels are Important

Increased flexibility

Minimal Intrusion







Slides





Denny Cherry & Associates Consulting

Feedback always appreciated!!!









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