



Aas Trailblazers

Unleashing insights

Resource Classes

Overview

Pre-determined resource limits defined for a user or role.

Benefits

Govern the system memory assigned to each query.

Effectively used to control the number of concurrent queries that can run on a data warehouse.

```
/* View resource classes in the data warehouse */
SELECT name
FROM    sys.database_principals
WHERE   name LIKE '%rc%' AND type_desc = 'DATABASE_ROLE';

/* Change user's resource class to 'largerc' */
EXEC sp_addrolemember 'largerc', 'loaduser';

/* Decrease the loading user's resource class */
EXEC sp_droprolemember 'largerc', 'loaduser';
```

Queries that honor resource classes

INSERT-SELECT	CREATE CLUSTERED COLUMNSTORE INDEX
UPDATE	CREATE TABLE AS SELECT (CTAS)
DELETE	Data loading
SELECT (when querying user tables)	Data movement operations conducted by the Data Movement Service (DMS)
ALTER INDEX REBUILD	
ALTER INDEX REORGANIZE	
ALTER TABLE REBUILD	
CREATE INDEX	

Queries that don't honor resource classes

CREATE or DROP TABLE	CREATE LOGIN
ALTER TABLE ... SWITCH, SPLIT, or MERGE PARTITION	CREATE, ALTER or DROP USER
ALTER INDEX DISABLE	CREATE, ALTER or DROP PROCEDURE
DROP INDEX	CREATE or DROP VIEW
CREATE, UPDATE, or DROP STATISTICS	INSERT VALUES
TRUNCATE TABLE	SELECT from system views and DMVs
ALTER AUTHORIZATION	EXPLAIN
	DBCC

<https://docs.microsoft.com/en-us/azure/synapse-analytics/sql-data-warehouse/resource-classes-for-workload-management>

Resource Classes

Static Resource Classes

Allocate the same amount of memory independent of the current performance level of the SQL pool.

Well-suited for fixed data sizes and loading jobs.

Dynamic Resource Classes

Allocate a variable amount of memory depending on the current performance level of the SQL pool.

Well-suited for growing or variable datasets.

All users default to the *smallrc* dynamic resource class.

Static resource classes:

staticrc10 | staticrc20 | staticrc30 |
staticrc40 | staticrc50 | staticrc60 |
staticrc70 | staticrc80

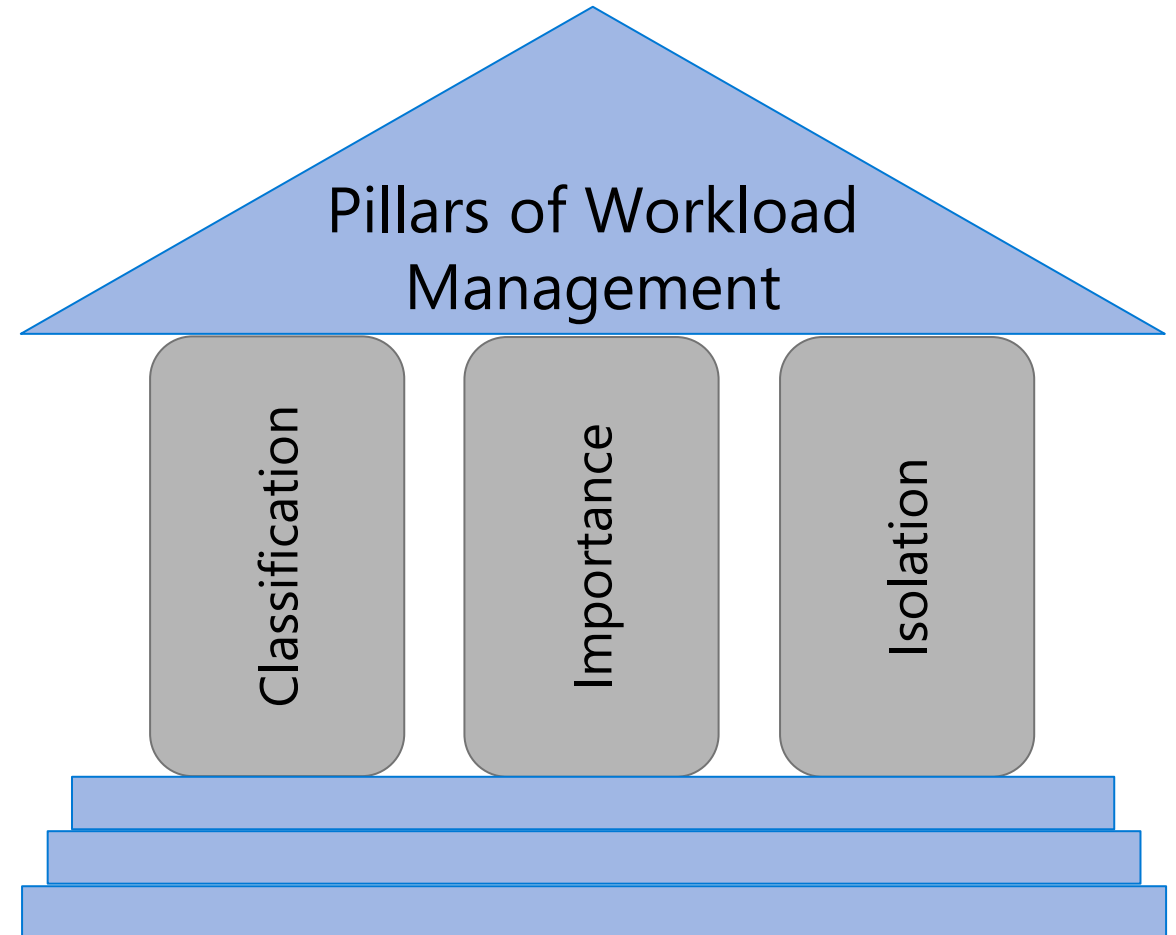
Dynamic resource classes:

smallrc | mediumrc | largerc | xlargerc

Resource Class	Percentage Memory (for DW1000c)	Max. Concurrent Queries
smallrc	3%	32
mediumrc	10%	10
largerc	22%	4
xlargerc	70%	1

Workload Management – Overview

- It manages resources, ensures highly efficient resource utilization, and maximizes return on investment (ROI).
- The three pillars of workload management are
 - Workload Isolation – To reserve resources for a workload group.
 - Workload Importance – To influence the order in which a request gets access to resources.
 - Workload Classification – To assign a request to a workload group and setting importance levels.



Workload Isolation

Overview

Allocate fixed resources to workload group.

Assign maximum and minimum usage for varying resources under load. These adjustments can be done live without having to Synapse SQL (provisioned) offline.

Benefits

Reserve resources for a group of requests

Limit the amount of resources a group of requests can consume

Shared resources accessed based on importance level

Set Query timeout value. Get DBAs out of the business of killing runaway queries

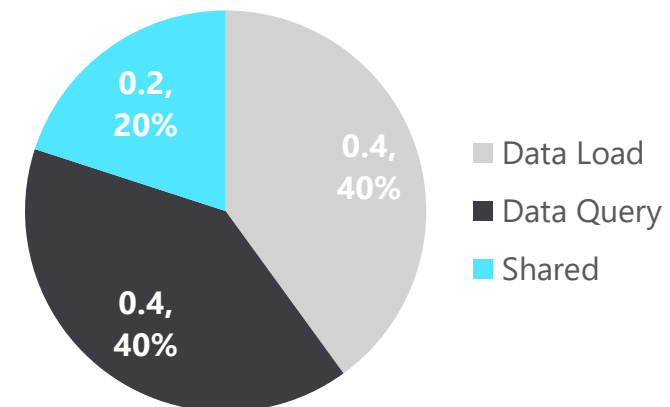
Monitoring DMVs

[sys.workload_management_workload_groups](#)

Query to view configured workload group.

```
CREATE WORKLOAD GROUP group_name
WITH
(
    MIN_PERCENTAGE_RESOURCE = value
    , CAP_PERCENTAGE_RESOURCE = value
    , REQUEST_MIN_RESOURCE_GRANT_PERCENT = value
    [ [ , ] REQUEST_MAX_RESOURCE_GRANT_PERCENT = value ]
    [ [ , ] IMPORTANCE = {LOW | BELOW_NORMAL | NORMAL | ABOVE_NORMAL | HIGH} ]
    [ [ , ] QUERY_EXECUTION_TIMEOUT_SEC = value ]
)[ ; ]
```

EXAMPLE RESOURCE ALLOCATION



Workload Classification

Overview

Map queries to allocations of resources via pre-determined rules.

Use with workload importance to effectively share resources across different workload types.

If a query request is not matched to a classifier, it is assigned to the default workload group.

Benefits

Map queries to both Resource Management and Workload Isolation concepts.

Monitoring DMVs

[sys.workload_management_workload_classifiers](#)

[sys.workload_management_workload_classifier_details](#)

Query DMVs to view details about all active workload classifiers.

```
CREATE WORKLOAD CLASSIFIER classifier_name
WITH
(
    WORKLOAD_GROUP = 'name'
    , MEMBERNAME   = 'security_account'
    [ [ , ] IMPORTANCE = {LOW|BELOW_NORMAL|NORMAL|ABOVE_NORMAL|HIGH} ] )
    [ [ , ] WLM_LABEL   = 'label' ]
    [ [ , ] WLM_CONTEXT = 'name' ]
    [ [ , ] START_TIME  = 'start_time' ]
    [ [ , ] END_TIME    = 'end_time' ]
)[ ; ]
```

WORKLOAD_GROUP: maps to an existing resource class

IMPORTANCE: specifies relative importance of
request

MEMBERNAME: database user, role, AAD login or AAD
group

Workload Importance

Overview

Queries past the concurrency limit enter a FiFo queue

By default, queries are released from the queue on a first-in, first-out basis as resources become available

Workload importance allows higher priority queries to receive resources immediately regardless of queue

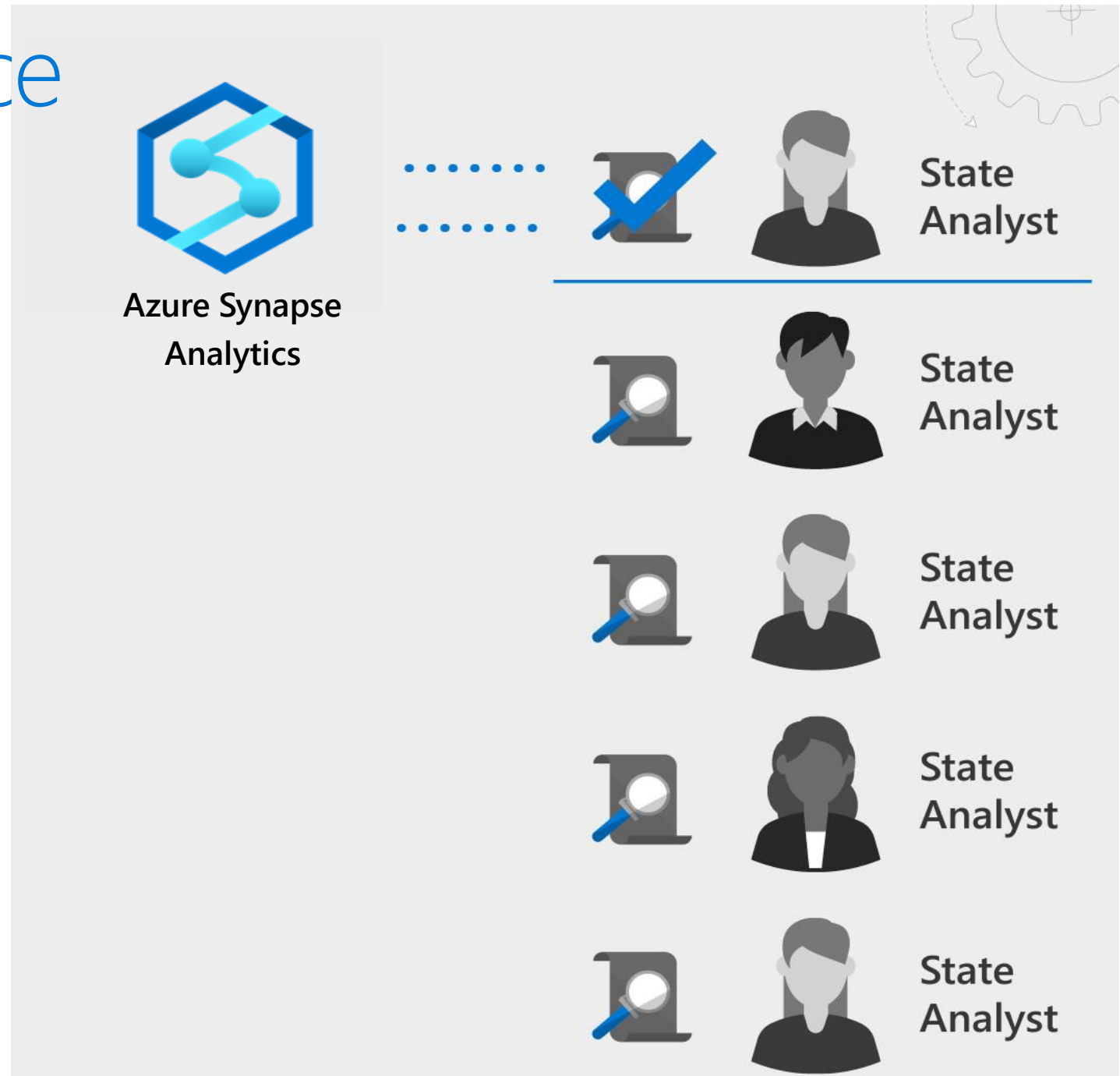
Example Video

State analysts have normal importance.

National analyst is assigned high importance.

State analyst queries execute in order of arrival

When the national analyst's query arrives, it jumps to the top of the queue



Demo