**What are Dynamic Management Views (DMVs)**

Another tool at your disposal to measure performance and view details about the SQL Server is the DMVs. Dynamic management views and functions return server state information that can be used to monitor the health of a server instance, diagnose problems, and tune performance

There are two different kinds of DMVs and DMFs:

* Server-scoped: These look at the state of an entire SQL Server instance.
* Database-scoped: These look at the state of a specific database
* While the DMV can be used like the select statement, the DMF requires a parameter
* Some apply to entire server and are stored in the master database while others to each database
* Over 200 DMVs at this time

The DMVs are broken down into the following categories:

* Change Data Capture Related Dynamic Management Views
* Change Tracking Related Dynamic Management Views
* Common Language Runtime Related Dynamic Management Views
* Database Mirroring Related Dynamic Management Views
* Database Related Dynamic Management Views
* Execution Related Dynamic Management Views and Functions
* Extended Events Dynamic Management Views
* Full-Text Search Related Dynamic Management Views
* Filestream-Related Dynamic Management Views (Transact-SQL)
* I/O Related Dynamic Management Views and Functions
* Index Related Dynamic Management Views and Functions
* Object Related Dynamic Management Views and Functions
* Query Notifications Related Dynamic Management Views
* Replication Related Dynamic Management Views
* Resource Governor Dynamic Management Views
* Service Broker Related Dynamic Management Views
* SQL Server Operating System Related Dynamic Management Views
* Transaction Related Dynamic Management Views and Functions
* Security Related Dynamic Management Views

--website to DMV

<https://msdn.microsoft.com/en-us/library/ms188754.aspx>

A few common examples of DMVs:

--view all DMVs

SELECT name, type, type\_desc

FROM sys.system\_objects

WHERE name LIKE 'dm\_%'

ORDER BY 2 desc

SELECT \* FROM SYS.dm\_os\_memory\_allocations --<< Notice that all DMVs starts with SYS.DM

SELECT \* FROM SYS.dm\_db\_xtp\_nonclustered\_index\_stats

SELECT \* FROM SYS.dm\_db\_mirroring\_past\_actions

SELECT \* FROM SYS.dm\_xe\_session\_object\_columns

SELECT \* FROM SYS.dm\_os\_loaded\_modules

SELECT \* FROM SYS.dm\_db\_task\_space\_usage

SELECT \* FROM SYS.dm\_os\_memory\_objects

SELECT \* FROM SYS.dm\_audit\_class\_type\_map

SELECT \* FROM SYS.dm\_os\_schedulers

SELECT \* FROM SYS.dm\_os\_server\_diagnostics\_log\_configurations

SELECT \* FROM SYS.dm\_hadr\_instance\_node\_map

SELECT \* FROM SYS.dm\_io\_cluster\_valid\_path\_names

SELECT \* FROM SYS.dm\_os\_dispatcher\_pools

SELECT \* FROM SYS.dm\_xtp\_transaction\_stats

SELECT \* FROM SYS.dm\_exec\_query\_profiles

SELECT \* FROM SYS.dm\_os\_threads

SELECT \* FROM SYS.dm\_repl\_tranhash

SELECT \* FROM SYS.dm\_hadr\_cluster

SELECT \* FROM SYS.dm\_qn\_subscriptions

SELECT \* FROM SYS.dm\_db\_session\_space\_usage

SELECT \* FROM SYS.dm\_xtp\_gc\_stats

SELECT \* FROM SYS.dm\_exec\_query\_optimizer\_info

SELECT \* FROM SYS.dm\_xe\_map\_values

SELECT \* FROM SYS.dm\_db\_xtp\_index\_stats

SELECT \* FROM SYS.dm\_tran\_top\_version\_generators

SELECT \* FROM SYS.dm\_fts\_fdhosts

SELECT \* FROM SYS.dm\_xe\_sessions

SELECT \* FROM SYS.dm\_db\_log\_space\_usage

SELECT \* FROM SYS.dm\_hadr\_name\_id\_map

SELECT \* FROM SYS.dm\_os\_waiting\_tasks

SELECT \* FROM SYS.dm\_exec\_background\_job\_queue

SELECT \* FROM SYS.dm\_resource\_governor\_resource\_pool\_volumes

SELECT \* FROM SYS.dm\_os\_hosts

SELECT \* FROM SYS.dm\_os\_memory\_brokers

SELECT \* FROM SYS.dm\_exec\_requests

SELECT \* FROM SYS.dm\_tran\_commit\_table

SELECT \* FROM SYS.dm\_db\_missing\_index\_details

SELECT \* FROM SYS.dm\_clr\_properties

SELECT \* FROM SYS.dm\_os\_sublatches

SELECT \* FROM SYS.dm\_os\_buffer\_pool\_extension\_configuration

SELECT \* FROM SYS.dm\_exec\_query\_memory\_grants

SELECT \* FROM SYS.dm\_fts\_outstanding\_batches

SELECT \* FROM SYS.dm\_logpool\_hashentries

SELECT \* FROM SYS.dm\_os\_wait\_stats

SELECT \* FROM SYS.dm\_os\_memory\_node\_access\_stats

SELECT \* FROM SYS.dm\_os\_spinlock\_stats

SELECT \* FROM SYS.dm\_database\_encryption\_keys

SELECT \* FROM SYS.dm\_db\_xtp\_checkpoint\_stats

SELECT \* FROM SYS.dm\_hadr\_availability\_replica\_states

SELECT \* FROM SYS.dm\_broker\_connections

SELECT \* FROM SYS.dm\_db\_mirroring\_auto\_page\_repair

SELECT \* FROM SYS.dm\_server\_registry

SELECT \* FROM SYS.dm\_tran\_current\_snapshot

SELECT \* FROM SYS.dm\_os\_dispatchers

SELECT \* FROM SYS.dm\_os\_stacks

SELECT \* FROM SYS.dm\_db\_xtp\_object\_stats

SELECT \* FROM SYS.dm\_filestream\_non\_transacted\_handles

SELECT \* FROM SYS.dm\_xe\_session\_targets

SELECT \* FROM SYS.dm\_fts\_memory\_buffers

SELECT \* FROM SYS.dm\_fts\_index\_population

SELECT \* FROM SYS.dm\_tran\_current\_transaction

SELECT \* FROM SYS.dm\_os\_cluster\_properties

SELECT \* FROM SYS.dm\_os\_child\_instances

SELECT \* FROM SYS.dm\_exec\_connections

SELECT \* FROM SYS.dm\_server\_memory\_dumps

SELECT \* FROM SYS.dm\_xtp\_threads

SELECT \* FROM SYS.dm\_exec\_background\_job\_queue\_stats

SELECT \* FROM SYS.dm\_os\_memory\_broker\_clerks

SELECT \* FROM SYS.dm\_filestream\_file\_io\_handles

SELECT \* FROM SYS.dm\_xtp\_transaction\_recent\_rows

SELECT \* FROM SYS.dm\_hadr\_availability\_replica\_cluster\_nodes

SELECT \* FROM SYS.dm\_fts\_active\_catalogs

SELECT \* FROM SYS.dm\_tran\_database\_transactions

SELECT \* FROM SYS.dm\_filestream\_file\_io\_requests

SELECT \* FROM SYS.dm\_cdc\_log\_scan\_sessions

SELECT \* FROM SYS.dm\_os\_memory\_cache\_clock\_hands

SELECT \* FROM SYS.dm\_repl\_schemas

SELECT \* FROM SYS.dm\_db\_mirroring\_connections

SELECT \* FROM SYS.dm\_audit\_actions

SELECT \* FROM SYS.dm\_hadr\_availability\_group\_states

SELECT \* FROM SYS.dm\_os\_ring\_buffers

SELECT \* FROM SYS.dm\_db\_xtp\_table\_memory\_stats

SELECT \* FROM SYS.dm\_db\_missing\_index\_groups

SELECT \* FROM SYS.dm\_hadr\_cluster\_members

SELECT \* FROM SYS.dm\_db\_uncontained\_entities

SELECT \* FROM SYS.dm\_exec\_cached\_plans

SELECT \* FROM SYS.dm\_hadr\_availability\_replica\_cluster\_states

SELECT \* FROM SYS.dm\_exec\_sessions

SELECT \* FROM SYS.dm\_os\_memory\_clerks

SELECT \* FROM SYS.dm\_hadr\_auto\_page\_repair

SELECT \* FROM SYS.dm\_db\_xtp\_memory\_consumers

SELECT \* FROM SYS.dm\_repl\_articles

SELECT \* FROM SYS.dm\_xe\_session\_events

SELECT \* FROM SYS.dm\_broker\_forwarded\_messages

SELECT \* FROM SYS.dm\_resource\_governor\_resource\_pools

SELECT \* FROM SYS.dm\_db\_xtp\_checkpoint\_files

SELECT \* FROM SYS.dm\_db\_partition\_stats

SELECT \* FROM SYS.dm\_io\_pending\_io\_requests

SELECT \* FROM SYS.dm\_xtp\_system\_memory\_consumers

SELECT \* FROM SYS.dm\_hadr\_cluster\_networks

SELECT \* FROM SYS.dm\_os\_nodes

SELECT \* FROM SYS.dm\_tcp\_listener\_states

SELECT \* FROM SYS.dm\_os\_memory\_cache\_entries

SELECT \* FROM SYS.dm\_os\_virtual\_address\_dump

SELECT \* FROM SYS.dm\_os\_memory\_cache\_hash\_tables

SELECT \* FROM SYS.dm\_cdc\_errors

SELECT \* FROM SYS.dm\_resource\_governor\_configuration

SELECT \* FROM SYS.dm\_exec\_query\_stats

SELECT \* FROM SYS.dm\_fts\_semantic\_similarity\_population

SELECT \* FROM SYS.dm\_clr\_tasks

SELECT \* FROM SYS.dm\_db\_xtp\_hash\_index\_stats

SELECT \* FROM SYS.dm\_os\_worker\_local\_storage

SELECT \* FROM SYS.dm\_db\_persisted\_sku\_features

SELECT \* FROM SYS.dm\_os\_sys\_memory

SELECT \* FROM SYS.dm\_cryptographic\_provider\_properties

SELECT \* FROM SYS.dm\_tran\_transactions\_snapshot

SELECT \* FROM SYS.dm\_os\_buffer\_descriptors

SELECT \* FROM SYS.dm\_tran\_active\_snapshot\_database\_transactions

SELECT \* FROM SYS.dm\_server\_services

SELECT \* FROM SYS.dm\_tran\_active\_transactions

SELECT \* FROM SYS.dm\_db\_file\_space\_usage

SELECT \* FROM SYS.dm\_broker\_activated\_tasks

SELECT \* FROM SYS.dm\_broker\_queue\_monitors

SELECT \* FROM SYS.dm\_os\_memory\_cache\_counters

SELECT \* FROM SYS.dm\_tran\_session\_transactions

SELECT \* FROM SYS.dm\_clr\_appdomains

SELECT \* FROM SYS.dm\_db\_xtp\_gc\_cycle\_stats

SELECT \* FROM SYS.dm\_exec\_trigger\_stats

SELECT \* FROM SYS.dm\_os\_memory\_pools

SELECT \* FROM SYS.dm\_os\_latch\_stats

SELECT \* FROM SYS.dm\_io\_backup\_tapes

SELECT \* FROM SYS.dm\_db\_xtp\_merge\_requests

SELECT \* FROM SYS.dm\_resource\_governor\_workload\_groups

SELECT \* FROM SYS.dm\_hadr\_database\_replica\_states

SELECT \* FROM SYS.dm\_fts\_memory\_pools

SELECT \* FROM SYS.dm\_resource\_governor\_resource\_pool\_affinity

SELECT \* FROM SYS.dm\_os\_sys\_info

SELECT \* FROM SYS.dm\_tran\_locks

SELECT \* FROM SYS.dm\_exec\_procedure\_stats

SELECT \* FROM SYS.dm\_hadr\_database\_replica\_cluster\_states

SELECT \* FROM SYS.dm\_exec\_query\_transformation\_stats

SELECT \* FROM SYS.dm\_exec\_query\_resource\_semaphores

SELECT \* FROM SYS.dm\_repl\_traninfo

SELECT \* FROM SYS.dm\_db\_missing\_index\_group\_stats

SELECT \* FROM SYS.dm\_fts\_population\_ranges

SELECT \* FROM SYS.dm\_os\_performance\_counters

SELECT \* FROM SYS.dm\_os\_workers

SELECT \* FROM SYS.dm\_xe\_session\_event\_actions

SELECT \* FROM SYS.dm\_db\_script\_level

SELECT \* FROM SYS.dm\_server\_audit\_status

SELECT \* FROM SYS.dm\_io\_cluster\_shared\_drives

SELECT \* FROM SYS.dm\_os\_tasks

SELECT \* FROM SYS.dm\_db\_fts\_index\_physical\_stats

SELECT \* FROM SYS.dm\_xe\_packages

SELECT \* FROM SYS.dm\_logpool\_stats

SELECT \* FROM SYS.dm\_os\_memory\_nodes

SELECT \* FROM SYS.dm\_tran\_version\_store

SELECT \* FROM SYS.dm\_os\_windows\_info

SELECT \* FROM SYS.dm\_os\_cluster\_nodes

SELECT \* FROM SYS.dm\_xtp\_gc\_queue\_stats

SELECT \* FROM SYS.dm\_os\_process\_memory

SELECT \* FROM SYS.dm\_xe\_objects

SELECT \* FROM SYS.dm\_xe\_object\_columns

SELECT \* FROM SYS.dm\_db\_xtp\_transactions

SELECT \* FROM SYS.dm\_clr\_loaded\_assemblies

SELECT \* FROM SYS.dm\_db\_index\_usage\_stats

/\* DMV to list all empty tables in your database. \*/

Use AdventureWorks2012

go

;WITH Empty AS

(

SELECT

OBJECT\_NAME(OBJECT\_ID) [Table],

SUM(row\_count) [Records]

FROM

sys.dm\_db\_partition\_stats

WHERE

index\_id = 0 OR index\_id = 1

GROUP BY

OBJECT\_ID

)

SELECT [Table],Records

FROM [Empty]

WHERE [Records] = 0

/\*

dmvs for indexes, slow running quieries, missing indexes, statistice,

counters, cpu, memoru, I/), physical disk sessions, users, security,

database info

\*/

Select \* from sys.dm\_exec\_connections

Select \* from sys.dm\_exec\_sessions

Select \* from sys.dm\_exec\_requests

Select \* from sys.dm\_db\_index\_usage\_stats

Select \* from sys.dm\_db\_missing\_index\_group\_stats

Select \* from sys.dm\_os\_performance\_counters

select \* from sys.dm\_os\_sys\_memory

--allow the DBA to identify where the bulk of the connections originate

SELECT dec.client\_net\_address ,

des.program\_name ,

des.host\_name ,

--des.login\_name

COUNT(dec.session\_id) AS connection\_count

FROM sys.dm\_exec\_sessions AS des

INNER JOIN sys.dm\_exec\_connections AS dec

ON des.session\_id = dec.session\_id

-- WHERE LEFT(des.host\_name, 2) = 'WK'

GROUP BY dec.client\_net\_address ,

des.program\_name ,

des.host\_name

-- des.login\_name

-- HAVING COUNT(dec.session\_id) > 1

ORDER BY des.program\_name,

dec.client\_net\_address ;

--who are directly connected to the SQL Server instance

SELECT dec.client\_net\_address ,

des.host\_name ,

dest.text

FROM sys.dm\_exec\_sessions des

INNER JOIN sys.dm\_exec\_connections dec

ON des.session\_id = dec.session\_id

CROSS APPLY sys.dm\_exec\_sql\_text(dec.most\_recent\_sql\_handle) dest

WHERE des.program\_name LIKE 'Microsoft SQL Server Management Studio%'

ORDER BY des.program\_name ,

dec.client\_net\_address

--Find indexes for database

use AdventureWorks2012

go

SELECT DB\_NAME(ddius.[database\_id]) AS database\_name ,

OBJECT\_NAME(ddius.[object\_id], DB\_ID('AdventureWorks2012')) --<< replace db name

AS [object\_name] ,

asi.[name] AS index\_name ,

ddius.user\_seeks + ddius.user\_scans + ddius.user\_lookups AS user\_reads

FROM sys.dm\_db\_index\_usage\_stats ddius

INNER JOIN AdventureWorks2012.sys.indexes asi

ON ddius.[object\_id] = asi.[object\_id]

AND ddius.index\_id = asi.index\_id ;

--userful DMV for determining usage of index

SELECT OBJECT\_NAME(ddius.[object\_id], ddius.database\_id) AS [object\_name] ,

ddius.index\_id ,

ddius.user\_seeks ,

ddius.user\_scans ,

ddius.user\_lookups ,

ddius.user\_seeks + ddius.user\_scans + ddius.user\_lookups

AS user\_reads ,

ddius.user\_updates AS user\_writes ,

ddius.last\_user\_scan ,

ddius.last\_user\_update

FROM sys.dm\_db\_index\_usage\_stats ddius

WHERE ddius.database\_id > 4 -- filter out system tables

AND OBJECTPROPERTY(ddius.object\_id, 'IsUserTable') = 1

AND ddius.index\_id > 0 -- filter out heaps

ORDER BY ddius.user\_scans DESC

-- List unused indexes

SELECT OBJECT\_NAME(i.[object\_id]) AS [Table Name] ,

i.name

FROM sys.indexes AS i

INNER JOIN sys.objects AS o ON i.[object\_id] = o.[object\_id]

WHERE i.index\_id NOT IN ( SELECT ddius.index\_id

FROM sys.dm\_db\_index\_usage\_stats AS ddius

WHERE ddius.[object\_id] = i.[object\_id]

AND i.index\_id = ddius.index\_id

AND database\_id = DB\_ID() )

AND o.[type] = 'U'

ORDER BY OBJECT\_NAME(i.[object\_id]) ASC ;

**--STOP**

--Current Running Transaction

use master

SELECT

SPID,ER.percent\_complete,

CAST(((DATEDIFF(s,start\_time,GetDate()))/3600) as varchar) + ' hour(s), '

+ CAST((DATEDIFF(s,start\_time,GetDate())%3600)/60 as varchar) + 'min, '

+ CAST((DATEDIFF(s,start\_time,GetDate())%60) as varchar) + ' sec' as running\_time,

CAST((estimated\_completion\_time/3600000) as varchar) + ' hour(s), '

+ CAST((estimated\_completion\_time %3600000)/60000 as varchar) + 'min, '

+ CAST((estimated\_completion\_time %60000)/1000 as varchar) + ' sec' as est\_time\_to\_go,

DATEADD(second,estimated\_completion\_time/1000, getdate()) as est\_completion\_time,

ER.command,ER.blocking\_session\_id, SP.DBID,LASTWAITTYPE,

DB\_NAME(SP.DBID) AS DBNAME,

SUBSTRING(est.text, (ER.statement\_start\_offset/2)+1,

((CASE ER.statement\_end\_offset

WHEN -1 THEN DATALENGTH(est.text)

ELSE ER.statement\_end\_offset

END - ER.statement\_start\_offset)/2) + 1) AS QueryText,

TEXT,CPU,HOSTNAME,LOGIN\_TIME,LOGINAME,

SP.status,PROGRAM\_NAME,NT\_DOMAIN, NT\_USERNAME

FROM SYSPROCESSES SP

INNER JOIN

sys.dm\_exec\_requests ER

ON sp.spid = ER.session\_id

CROSS APPLY SYS.DM\_EXEC\_SQL\_TEXT(er.sql\_handle) EST

--Run following query to find longest running query using T-SQL

SELECT DISTINCT TOP 3

t.TEXT QueryName,

s.execution\_count AS ExecutionCount,

s.max\_elapsed\_time AS MaxElapsedTime,

--ISNULL(s.total\_elapsed\_time / s.execution\_count, 0) AS AvgElapsedTime,

s.creation\_time AS LogCreatedOn--,

--ISNULL(s.execution\_count / DATEDIFF(s, s.creation\_time, GETDATE()), 0) AS FrequencyPerSec

FROM sys.dm\_exec\_query\_stats s

CROSS APPLY sys.dm\_exec\_sql\_text( s.sql\_handle ) t

ORDER BY

s.max\_elapsed\_time DESC

GO

-- Top 5 worst performing Queries

SELECT

TOP 5 obj.name, max\_logical\_reads, max\_elapsed\_time

FROM

sys.dm\_exec\_query\_stats a CROSS APPLY

sys.dm\_exec\_sql\_text(sql\_handle) hnd INNER JOIN

sys.sysobjects obj on hnd.objectid = obj.id

ORDER BY

max\_logical\_reads DESC

--TOP 5 CPU-CONSUMING STATEMENTS

SELECT TOP 5

qs.total\_worker\_time/(qs.execution\_count\*60000000) as [Avg CPU Time in mins],

qs.execution\_count,

qs.min\_worker\_time/60000000 as [Min CPU Time in mins],

--qs.total\_worker\_time/qs.execution\_count,

SUBSTRING(qt.text,qs.statement\_start\_offset/2,

(case when qs.statement\_end\_offset = -1

then len(convert(nvarchar(max), qt.text)) \* 2

else qs.statement\_end\_offset end -qs.statement\_start\_offset)/2)

as query\_text,

dbname=db\_name(qt.dbid),

object\_name(qt.objectid) as [Object name]

FROM

sys.dm\_exec\_query\_stats qs cross apply

sys.dm\_exec\_sql\_text(qs.sql\_handle) as qt

ORDER BY

[Avg CPU Time in mins] DESC