

Monitoring (Azure) SQL  
DB with Zabbix

SQL Friday 21-04-2022

# Why?

- ▶ Baselines
- ▶ Issue detection
- ▶ History
- ▶ What is my instance doing



## But, why?

- ▶ Proactive management and maintenance
- ▶ Tackle problems before they become an issue
- ▶ Explain past issues



# What

- ▶ Azure SQL DB != SQL Server
- ▶ Every database is different
- ▶ Different interpretations



## How?

- ▶ SQL Server Management Studio or Azure Data Studio?
- ▶ There's the Azure portal...
- ▶ You can use (expensive) software
- ▶ You can try the TICK Stack
- ▶ Zabbix



# What will you learn (hopefully)

- ▶ Zabbix can be cool
- ▶ Configuration isn't hard
- ▶ You can do it
- ▶ With some tinkering, you can do magical things
- ▶ There are some presents at the end!





# Hello!

**Reitse Eskens**

I am here because I love my DBA job and share knowledge.



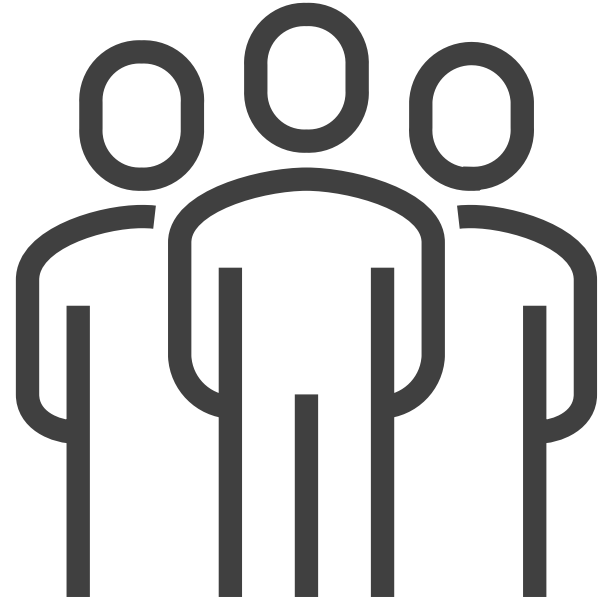
MCSA, MCSE, MCT and a number of Azure certs

You can reach me at  
**@2meterdba (twitter)**

**reitse.eskens@axians.com**

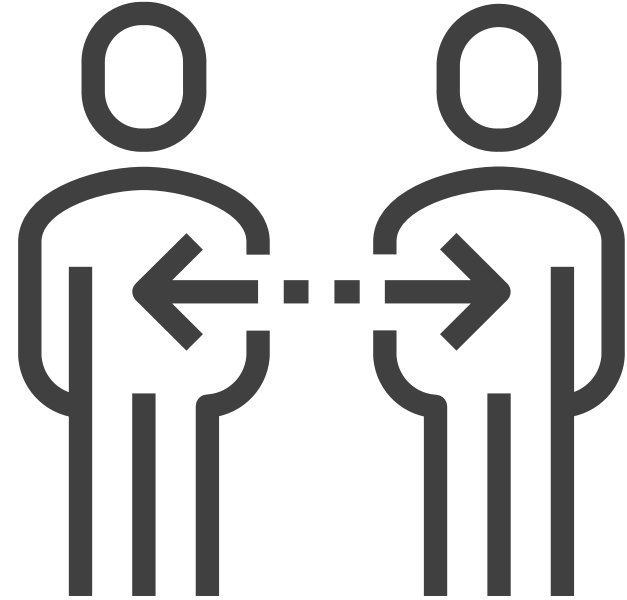


- ▶ Server infrastructure monitoring
- ▶ Runs on Linux
- ▶ Graphical interface
- ▶ Many templates from the community



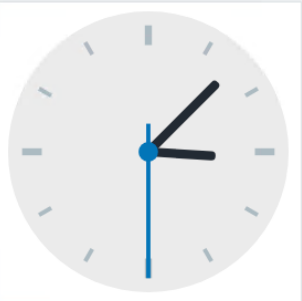
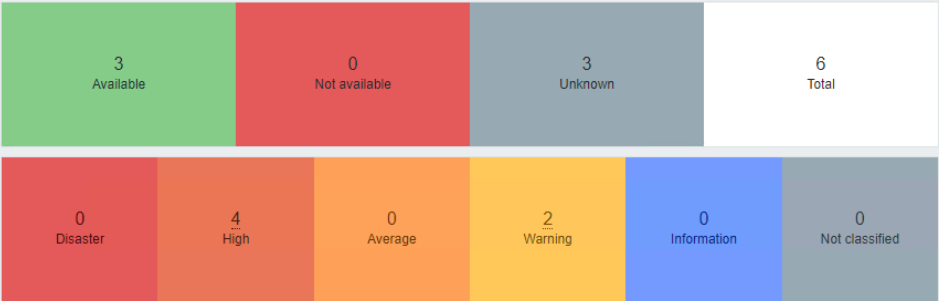


- ▶ Might already run in your organisation
- ▶ Prebuilt templates for SQL Server, Oracle and a lot more
- ▶ Easy to learn and create your own templates
- ▶ Show results on the dashboard

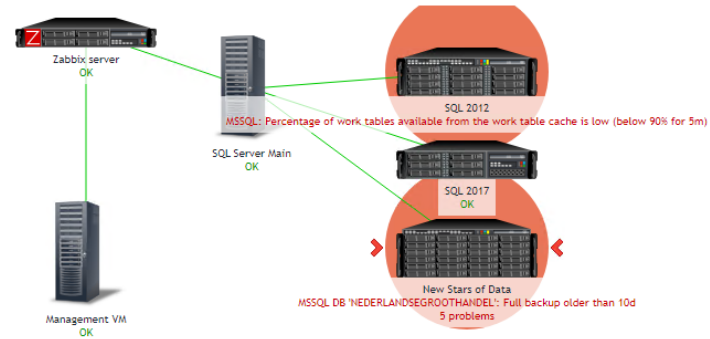


System information

Parameter	Value	Details
Zabbix server is running	Yes	localhost:10051
Number of hosts (enabled/disabled)	6	6 / 0
Number of templates	294	
Number of items (enabled/disabled/not supported)	752	744 / 0 / 8
Number of triggers (enabled/disabled [problem/ok])	384	383 / 1 [6 / 377]
Number of users (online)	2	1
Required server performance, new values per second	6.17	



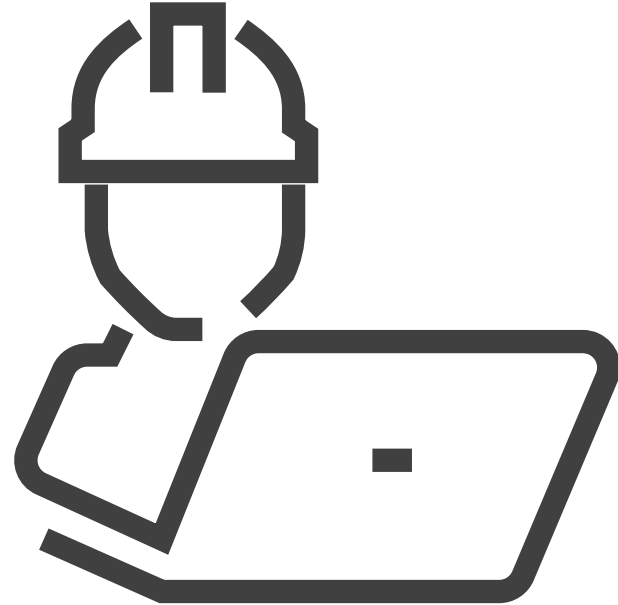
Local Hosting



Problems

Time	Info	Host	Problem • Severity	Duration	Ack	Actions	Tags
14:04:03	New Stars of Data		MSSQL: Percent of adhoc queries running is over 10% for 15m	2m 45s	No		class: database component: application scope: performance
12:13:11	New Stars of Data		MSSQL DB 'NEDERLANDSEGROOTHANDEL': Full backup older than 10d	1h 53m 37s	No		class: database component: database database: NEDERLA...
12:13:11	New Stars of Data		MSSQL DB 'F1': Full backup older than 10d	1h 53m 37s	No		class: database component: database database: F1
12:13:10	New Stars of Data		MSSQL Job 'AX_OH_DAILY_FULL_BACKUP': Failed to run	1h 53m 38s	No		class: database component: mssql-job mssql-job: AX_OH_D...
12:04:00	New		MSSQL: Percentage of work tables	2h 2m 48s	No		class: database

- Installation guides are online
- Configure the firewall on the Linux machine
- Create user accounts with correct rights
- Create your SQL ODBC connection in Linux, take care who can access that folder!



An overhead view of five business professionals (three men and two women) sitting in a circle on a light-colored tiled floor. They are all looking down at their hands, which are stacked in the center of the circle. The image has a blue-to-purple gradient overlay.

axians


**DEMO!**

```
sudo su
curl https://packages.microsoft.com/keys/microsoft.asc | apt-key add -

curl https://packages.microsoft.com/config/ubuntu/20.04/prod.list > /etc/apt/sources.list.d/mssql-release.list

exit
sudo apt-get update
sudo ACCEPT_EULA=Y apt-get install -y msodbcsql17
# optional: for bcp and sqlcmd
sudo ACCEPT_EULA=Y apt-get install -y mssql-tools
echo 'export PATH="$PATH:/opt/mssql-tools/bin"' >> ~/.bashrc
source ~/.bashrc
# optional: for unixODBC development headers
sudo apt-get install -y unixodbc-dev
```

ini

 Copy

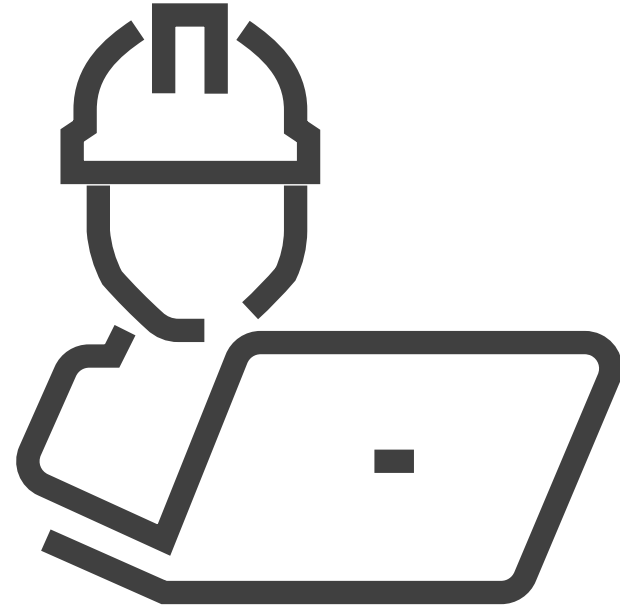
```
# [DSN name]
[MSSQLTest]
Driver = ODBC Driver 17 for SQL Server
# Server = [protocol:]server[,port]
Server = tcp:localhost,1433
#
# Note:
# Port is not a valid keyword in the odbc.ini file
# for the Microsoft ODBC driver on Linux or macOS
#
```

<https://docs.microsoft.com/en-us/sql/connect/odbc/linux-mac/connection-string-keywords-and-data-source-names-dsns?view=sql-server-ver15>

```
[DEMO DB]
Driver = ODBC Driver 17 for SQL Server
Server = MyDemoDB.database.windows.net
Database = myDemoDatabase
Port = 1433
```

You can add extra options to the ini file to suit your needs

- ▶ Most basic things are included
- ▶ Check the triggers. They might fire too fast. Or not
- ▶ The templates are incomplete, add your own metrics
- ▶ Check the configuration of the scripts





An overhead view of five business professionals (three men and two women) standing in a circle on a light-colored tiled floor. They are all reaching their hands towards the center, where they are stacked together. The image has a blue-to-purple gradient overlay. The word "axians" is in the top right, and "DEMO!" is on the left.

axians

**DEMO!**

# templates

<input type="checkbox"/> Name ▲
<input type="checkbox"/> Apache Cassandra by JMX
<input type="checkbox"/> Axians SQL Performance
<input type="checkbox"/> ClickHouse by HTTP
<input type="checkbox"/> Ignite by JMX
<input type="checkbox"/> MongoDB cluster by Zabbix Agent 2
<input type="checkbox"/> MongoDB node by Zabbix Agent 2
<input type="checkbox"/> MSSQL by ODBC
<input type="checkbox"/> MySQL by ODBC
<input type="checkbox"/> MySQL by Zabbix agent
<input type="checkbox"/> MySQL by Zabbix agent 2
<input type="checkbox"/> Oracle by ODBC
<input type="checkbox"/> Oracle by Zabbix Agent 2
<input type="checkbox"/> PostgreSQL
<input type="checkbox"/> PostgreSQL Agent 2
<input type="checkbox"/> Redis

## Host

Host IPMI Tags Macros 4 Inventory Encryption Value mapping

\* Host name

Visible name

Templates	Name	Action
	MSSQL by ODBC	<a href="#">Unlink</a> <a href="#">Unlink and clear</a>

<input type="text" value="type here to search"/>	Select
--	--------

* Groups	<div>Sql Instances ✕</div> <input type="text" value="type here to search"/>	Select
----------	---	--------

Interfaces	Type	IP address	DNS name	Connect to	Port	Default
	Agent	<input type="text" value="10.4.0.4"/>	<input type="text" value="VMSQL01"/>	<div>IP DNS</div>	<input type="text" value="10050"/>	<input checked="" type="radio"/> <a href="#">Remove</a>

[Add](#)

Description

### Host

Host IPMI Tags **Macros 5** Inventory Encryption Value mapping

Host macros Inherited and host macros

Macro	Value	De
{MSSQL.DSN}	SQLEXPRESS2012	T ▼ de
{MSSQL.INSTANCE}	MSSQL\$SQLEXPRESS2012	T ▼ de
{MSSQL.PASSWORD}	.....	🔒 ▼ de
{MSSQL.PORT}	49772	T ▼ de
{MSSQL.USER}	nsod-admin	T ▼ de

[Add](#)

Make sure your port number is correct in the ODBC.ini file!

## | ERROR MESSAGES FOR ON PREMISES

ERROR MESSAGE: CONNECTION FAILED: SQLSTATE[08001]: [MICROSOFT][ODBC DRIVER 17 FOR SQL SERVER]SSL PROVIDER: [ERROR:1425F102:SSL ROUTINES:SSL\_CHOOSE\_CLIENT\_VERSION:UNSUPPORTED PROTOCOL]DATABASE CONNECTION ERROR

1. INSTALL OPEN SSL [HTTPS://WWW.HOWTOFORGE.COM/TUTORIAL/HOW-TO-INSTALL-OPENSSL-FROM-SOURCE-ON-LINUX/](https://www.howtoforge.com/tutorial/how-to-install-openssl-from-source-on-linux/)
2. EDIT /ETC/SSL/OPENSSL.CONF

1st line in the file added

```
openssl_conf = default_conf
```

3. END OF FILE:











```
[default_conf]
ssl_conf = ssl_sect

[ssl_sect]
system_default = system_default_sect

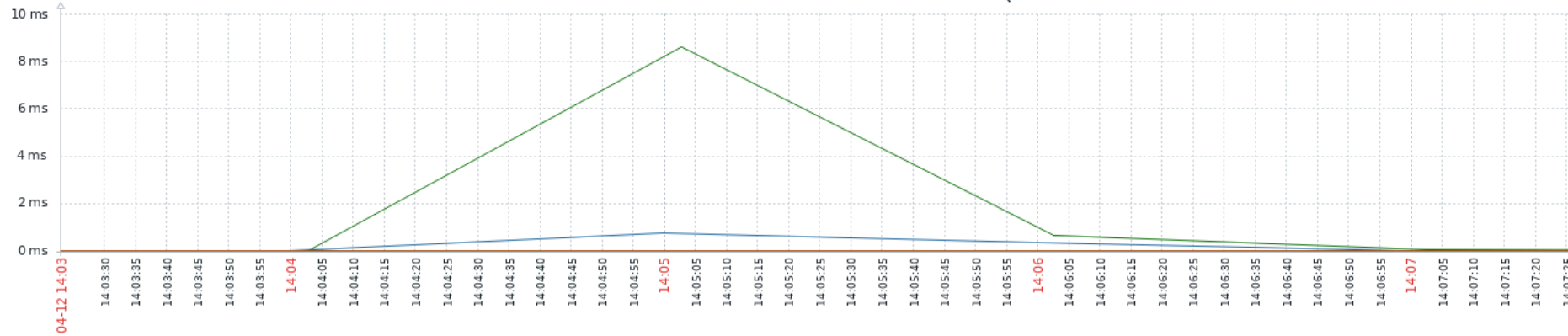
[system_default_sect]
MinProtocol = TLSv1
CipherString = DEFAULT@SECLEVEL=1
```

4. SYSTEMCTL RESTART APACHE2
5. SYSTEMCTL RESTART ZABBIX-SERVER



Name 	Interface	Availability	Tags	Status	Latest data	Problems	Graphs	Dashboards
<a href="#">Management VM</a>	10.4.0.5:10050		<span>class: os</span> <span>target: windows</span>	Enabled	<a href="#">Latest data</a>	<a href="#">Problems</a>	<a href="#">Graphs</a> 16	<a href="#">Dashboards</a> 2
<a href="#">New Stars of Data</a>	10.4.0.4:10050		<span>class: database</span> <span>target: mssql</span>	Enabled	<a href="#">Latest data</a>	 	<a href="#">Graphs</a> 29	<a href="#">Dashboards</a>
<a href="#">SQL 2012</a>	10.4.0.4:10050		<span>class: database</span> <span>target: mssql</span>	Enabled	<a href="#">Latest data</a>		<a href="#">Graphs</a> 17	<a href="#">Dashboards</a>
<a href="#">SQL 2017</a>	10.4.0.4:10050		<span>class: database</span> <span>target: mssql</span>	Enabled	<a href="#">Latest data</a>	<a href="#">Problems</a>	<a href="#">Graphs</a> 17	<a href="#">Dashboards</a>
<a href="#">SQL Server Main</a>	10.4.0.4:10050		<span>class: os</span> <span>target: windows</span>	Enabled	<a href="#">Latest data</a>	<a href="#">Problems</a>	<a href="#">Graphs</a> 34	<a href="#">Dashboards</a> 2
<a href="#">Zabbix server</a>	127.0.0.1:10050		<span>class: os</span> <span>class: software</span> <span>target: linux</span> ...	Enabled	<a href="#">Latest data</a>	<a href="#">Problems</a>	<a href="#">Graphs</a> 28	<a href="#">Dashboards</a> 4

New Stars of Data: MSSQL: Wait times



MSSQL: Average latch wait time	[avg]	last	min	avg	max
MSSQL: Total latch wait Time	[avg]	0 ms	0 ms	1.867 ms	8.6 ms
MSSQL: Total average wait time	[avg]	0 ms	0 ms	0.2249 ms	0.7258 ms
MSSQL: Lock wait time	[avg]	0 ms	0 ms	0 ms	0 ms
Trigger: MSSQL: Total average wait time for locks is high (over 500ms for 5m)	[> 500]				

An overhead view of five business professionals (three men and two women) standing in a circle on a light-colored tiled floor. They are all reaching their hands towards the center, where they are stacked together. The image has a blue-to-purple gradient overlay. The word "axians" is in the top right, and "DEMO!" is on the left.

axians

**DEMO!**



# Connection

```
root@vmzabbixdemo: /etc
GNU nano 4.8
# [DSN name]
[SQLEXPRESS2012]
Driver = ODBC Driver 17 for SQL Server
# Server = [protocol:]server[,port]
Server = tcp:10.4.0.4\SQLEXPRESS2012,49772
TrustServerCertificate=YES

[SQLEXPRESS2017]
Driver = ODBC Driver 17 for SQL Server
Server = tcp:10.4.0.4\SQLEXPRESS2017,49773

[SQL_NSOD]
Driver = ODBC Driver 17 for SQL Server
Server = tcp:10.4.0.4\sql_nsod,49857

[SQLAZURE]
Driver = ODBC Driver 17 for SQL Server
Server = srv-nsoddemo.database.windows.net
Database = AW-Restore
Port = 1433
```

# Connection

## New host



Details ▲ Cannot add host

Cannot find host interface on "srv-nsoddemo.database.windows.net" for item key "net.tcp.service[tcp,{HOST.CONN},{MSSQL.PORT}]".

Host IPMI Tags Macros 4 Inventory Encryption Value mapping

\* Host name

Visible name

Templates

type here to search

Select

\* Groups

type here to search

Select

Interfaces No interfaces are defined.

[Add](#)

# Connection

<input type="checkbox"/> Name ▲	Items	Triggers	Graphs	Discovery	Web	Interface	Proxy	Templates
<input type="checkbox"/> Management VM	Items 119	Triggers 82	Graphs 16	Discovery 4	Web	10.4.0.5:10050		<a href="#">ICMP Ping, Windows by Zabbix agent</a>
<input type="checkbox"/> New Stars of Data	Items 177	Triggers 74	Graphs 29	Discovery 7	Web	10.4.0.4:10050		<a href="#">MSSQL by ODBC</a>
<input type="checkbox"/> nsod-awrestore	Items 72	Triggers 24	Graphs 17	Discovery 7	Web	10.4.0.9:10050		<a href="#">MSSQL by ODBC</a>
<input type="checkbox"/> SQL 2012	Items 77	Triggers 26	Graphs 17	Discovery 7	Web	10.4.0.4:10050		<a href="#">MSSQL by ODBC</a>
<input type="checkbox"/> SQL 2017	Items 77	Triggers 26	Graphs 17	Discovery 7	Web	10.4.0.4:10050		<a href="#">MSSQL by ODBC</a>
<input type="checkbox"/> SQL Server Main	Items 164	Triggers 105	Graphs 34	Discovery 4	Web	10.4.0.4:10050		<a href="#">ICMP Ping, Windows by Zabbix agent</a>
<input type="checkbox"/> Zabbix server	Items 138	Triggers 71	Graphs 28	Discovery 4	Web	127.0.0.1:10050		<a href="#">Linux by Zabbix agent, Zabbix server health</a>

# Connection

[Host](#) [IPMI](#) [Tags](#) [Macros 4](#) [Inventory](#) [Encryption](#) [Value mapping](#)

Host macros

Inherited and host macros

Macro	Value		Description
{MSSQL.DSN}	SQLAZURE	T ▾	description
{MSSQL.INSTANCE}	MSSQL\$Azure	T ▾	description
{MSSQL.PASSWORD}	*****	🔒 ▾	description
{MSSQL.USER}	nsod-admin	T ▾	description

Add  
.....

# Incomplete data

```
[{"object_name":"MSSQL$Azure","counter_name":"Uptime","instance_name":"","cntr_value":"35076"},
{"object_name":"MSSQL$Azure","counter_name":"Version","instance_name":"Microsoft SQL Azure (RTM) - 12.0.2000.8 \n\tFeb 23 2022 11:32:53\n\tCopyright (C) 2021 Microsoft Corporation\n","cntr_value":"0"},
{"object_name":"MSSQL$Azure:Databases","counter_name":"State","instance_name":"AW-Restore","cntr_value":"0"},
{"object_name":"MSSQL$Azure:Databases","counter_name":"State","instance_name":"master","cntr_value":"0"},
{"object_name":"MSSQL$C74A654A3B92:Access Methods","counter_name":"AU cleanup batches/sec","instance_name":"","cntr_value":"450"},
{"object_name":"MSSQL$C74A654A3B92:Access Methods","counter_name":"AU cleanups/sec","instance_name":"","cntr_value":"450"},
{"object_name":"MSSQL$C74A654A3B92:Access Methods","counter_name":"By-reference Lob Create Count","instance_name":"","cntr_value":"0"},
{"object_name":"MSSQL$C74A654A3B92:Access Methods","counter_name":"By-reference Lob Use Count","instance_name":"","cntr_value":"0"},
{"object_name":"MSSQL$C74A654A3B92:Access Methods","counter_name":"Count Lob Readahead","instance_name":"","cntr_value":"0"},
{"object_name":"MSSQL$C74A654A3B92:Access Methods","counter_name":"Count Pull In Row","instance_name":"","cntr_value":"0"},
{"object_name":"MSSQL$C74A654A3B92:Access Methods","counter_name":"Count Push Off Row","instance_name":"","cntr_value":"0"},
{"object_name":"MSSQL$C74A654A3B92:Access Methods","counter_name":"Deferred dropped AUs","instance_name":"","cntr_value":"0"},
{"object_name":"MSSQL$C74A654A3B92:Access Methods","counter_name":"Deferred dropped AUs","instance_name":"","cntr_value":"0"}]
```

# Change the query






D: > Git > Speaking > SpeakingPrivate > 04-2022 SQL Friday > mssql performance counters.sql

```
1  SELECT concat(substring(object_name,0,7),'Azure', substring(object_name,charindex(':',object_name,0),50)) as object_name,counter_name,instance_name,cntr_value
2  FROM sys.dm_os_performance_counters
3  UNION
4  SELECT '{$MSSQL.INSTANCE}' as object_name,'Version' as counter_name,@@version as instance_name,0 as cntr_value
5  UNION
6  SELECT '{$MSSQL.INSTANCE}' as object_name,'Uptime' as counter_name,'' as instance_name,DATEDIFF(second,sqlserver_start_time,GETDATE()) as cntr_value
7  FROM sys.dm_os_sys_info
8  UNION
```

# More data

```
[{"object_name":"MSSQL$Azure","counter_name":"Uptime","instance_name":"","cntr_value":"36251"},
{"object_name":"MSSQL$Azure","counter_name":"Version","instance_name":"Microsoft SQL Azure (RTM) - 12.0.2000.8 \nFeb 23 2022 11:32:53
\nCopyright (C) 2021 Microsoft Corporation\n","cntr_value":"0"},{"object_name":"MSSQL$Azure:Access Methods","counter_name":"AU cleanup
batches/sec","instance_name":"","cntr_value":"466"},{"object_name":"MSSQL$Azure:Access Methods","counter_name":"AU
cleanups/sec","instance_name":"","cntr_value":"466"},{"object_name":"MSSQL$Azure:Access Methods","counter_name":"By-reference Lob Create
Count","instance_name":"","cntr_value":"0"},{"object_name":"MSSQL$Azure:Access Methods","counter_name":"By-reference Lob Use
Count","instance_name":"","cntr_value":"0"},{"object_name":"MSSQL$Azure:Access Methods","counter_name":"Count Lob
Readahead","instance_name":"","cntr_value":"0"},{"object_name":"MSSQL$Azure:Access Methods","counter_name":"Count Pull In
Row","instance_name":"","cntr_value":"0"},{"object_name":"MSSQL$Azure:Access Methods","counter_name":"Count Push Off
Row","instance_name":"","cntr_value":"0"},{"object_name":"MSSQL$Azure:Access Methods","counter_name":"Deferred dropped
AUs","instance_name":"","cntr_value":"0"},{"object_name":"MSSQL$Azure:Access Methods","counter_name":"Deferred Dropped
rowsets","instance_name":"","cntr_value":"0"},{"object_name":"MSSQL$Azure:Access Methods","counter_name":"Dropped rowset
cleanups/sec","instance_name":"","cntr_value":"0"},{"object_name":"MSSQL$Azure:Access Methods","counter_name":"Dropped rowsets
```

# Not everything is supported on Azure

Name ▲	Interval	Type	Status	Info
<a href="#">MSSQL by ODBC: Availability groups discovery</a>	1h	Database monitor	Not supported	
<a href="#">MSSQL by ODBC: Database discovery</a>	1h	Database monitor	Enabled	
<a href="#">MSSQL by ODBC: Local database discovery</a>	1h	Database monitor	Not supported	
<a href="#">MSSQL by ODBC: Mirroring discovery</a>	1h	Database monitor	Not supported	
<a href="#">MSSQL by ODBC: Non-local database discovery</a>	1h	Database monitor	Not supported	
<a href="#">MSSQL by ODBC: Replication discovery</a>	1h	Database monitor	Not supported	



Name
MSSQL: Service's TCP port state
MSSQL: Get performance counters
MSSQL: Percent of Adhoc queries running
MSSQL: Full scans to Index searches ratio
MSSQL: Percent of Recompiled Transact-SQL Objects
MSSQL: Total average wait time
MSSQL: Average latch wait time

# Items

MSSQL: Get performance counters: MSSQL: Cache objects in use

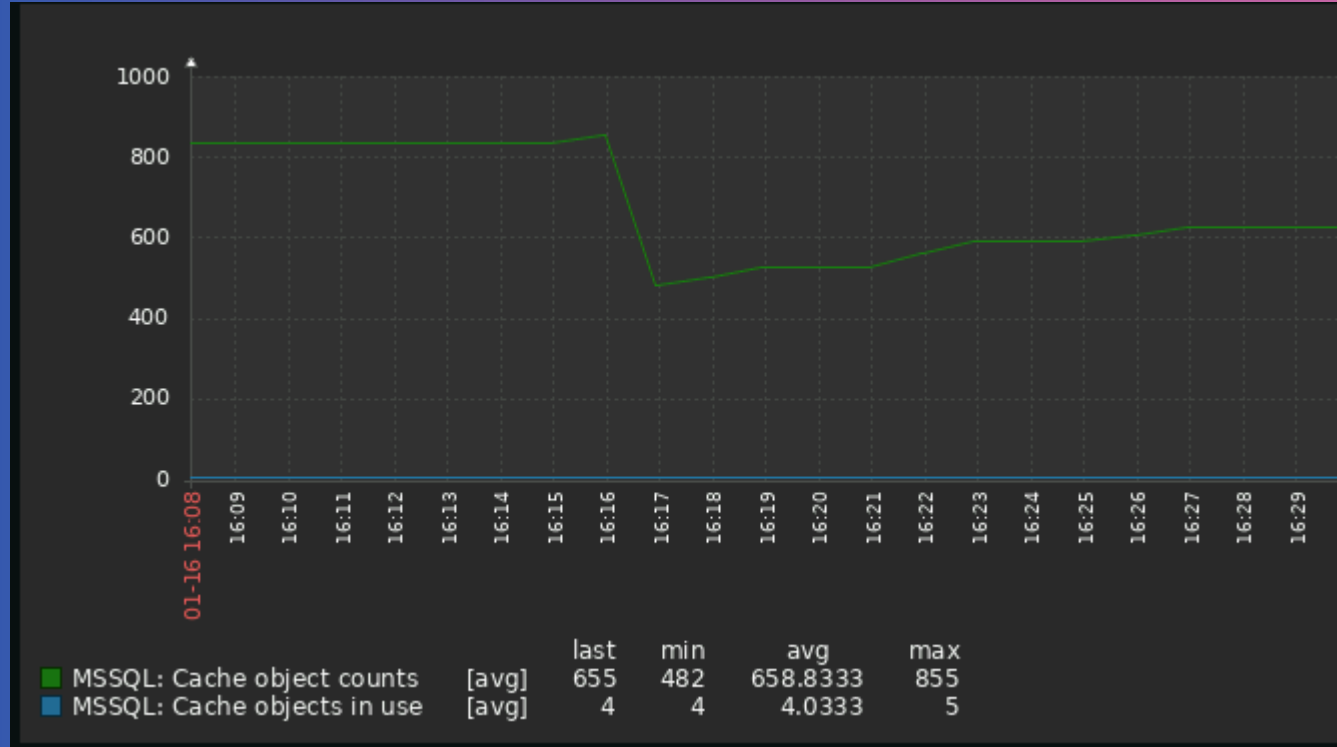
MSSQL: Get performance counters: MSSQL: Database pages

MSSQL: Get performance counters: MSSQL: Total data file size

MSSQL: Get performance counters: MSSQL: Checkpoint pages per second

MSSQL: Get performance counters: MSSQL: Cache pages

# Items



# triggers



Warning

MSSQL: Number of physical database page writes per second is high (over `{MSSQL.PAGE_WRITES.MAX}` for 5m)



High

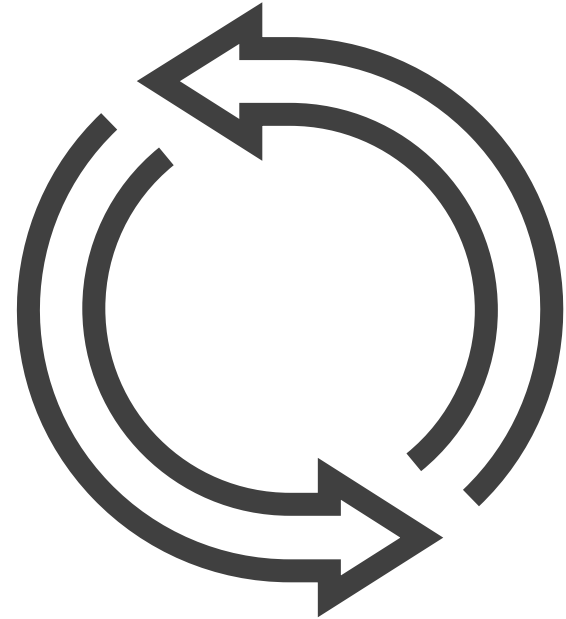
MSSQL: Percentage of the buffer cache efficiency is low (below `{MSSQL.BUFFER_CACHE_RATIO.MIN.CRIT}`% for 5m)



Disaster

MSSQL: Service is unavailable

- ▶ Create your own template
- ▶ Configure the measurements and triggers
- ▶ Add dashboards
- ▶ Evaluate the results, get peer reviews and share!



An overhead view of five business professionals (three men and two women) sitting in a circle on a light-colored tiled floor. They are all looking down at their hands, which are stacked in the center of the circle. The image has a blue-to-purple gradient overlay.

axians

**DEMO!**

# Wait stats

\* Name

GetWaitStats

Type

Database monitor ▼

\* Key

db.odbc.get[get\_wait\_stats,"{\$MSSQL.DSN}"]

Select

User name

{ \$MSSQL.USER }

Password

{ \$MSSQL.PASSWORD }

\* SQL query

SELECT  
wait\_type,  
wait\_time\_ms,  
waiting\_tasks\_count,  
signal\_wait\_time\_ms  
FROM sys.dm\_os\_wait\_stats  
WHERE wait\_type not in ('BROKER\_EVENTHANDLER'  
...)

# Wait stats

* Name	WaitStats: THREADPOOL		
Type	Dependent item ▼		
* Key	waitstats.THREADPOOL	Select	
* Master item	Axians SQL Performance: GetWaitStats ✕	Select	
Type of information	Numeric (unsigned) ▼		
Units	ms		
* History storage period	Do not keep history	Storage period	1d
* Trend storage period	Do not keep trends	Storage period	365d
Show value	As is ▼		<a href="#">show value mappings</a>
New application	<div></div>		
Applications	<div><div>-None-</div><div>Axians Performance</div><div>Axians Performance RAW data</div><div>Wait Statistics</div></div>		

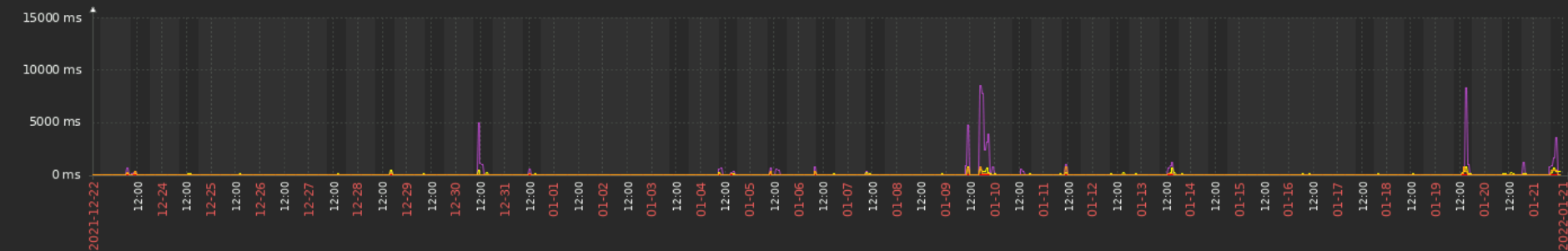


# Wait stats

Type	Dependent item	
* Key	waitstats.THREADPOOL	
* Name	WaitStats: Running THREADPOOL	
Type	Calculated	
* Key	waitstats.running.THREADPOOL	Select
* Formula	(last(waitstats.THREADPOOL) - prev(waitstats.THREADPOOL))	
Type of information	Numeric (unsigned)	
Units	ms	
* Update interval	5m	

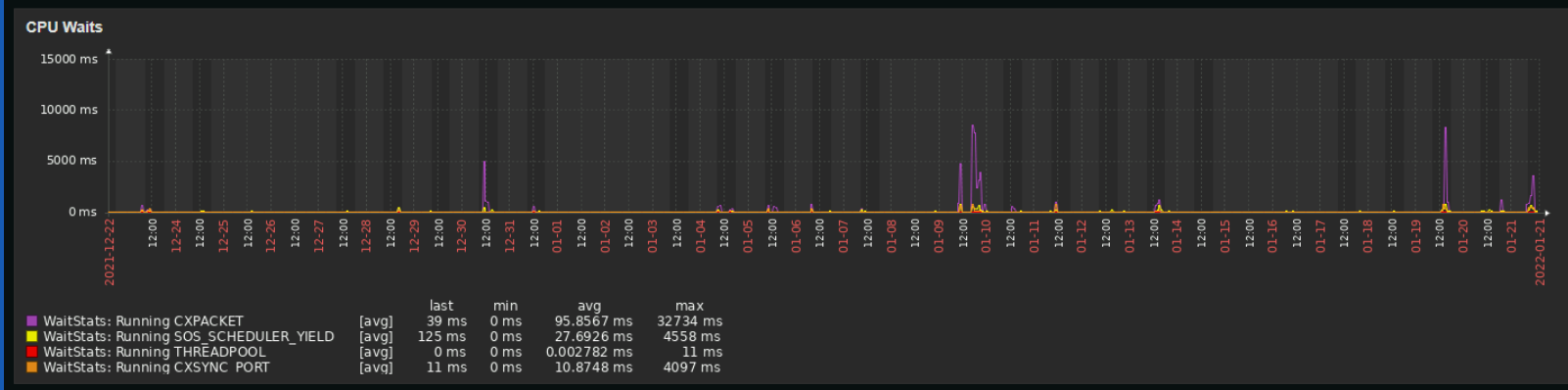
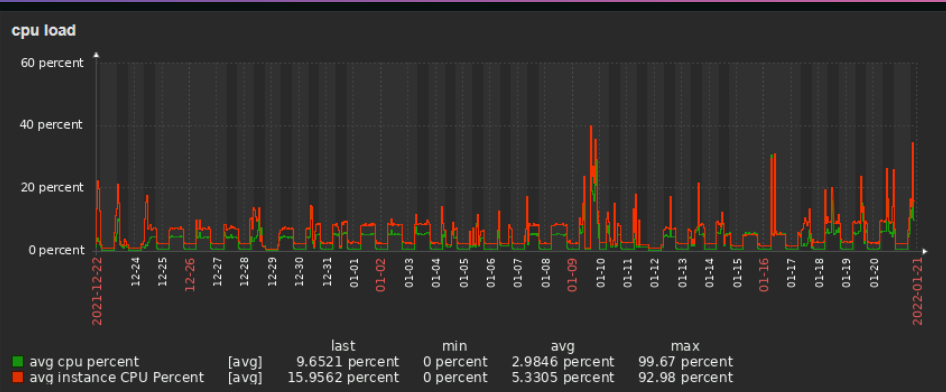
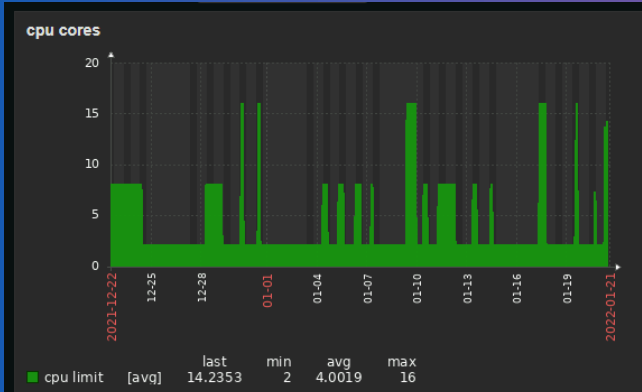
# Wait stats

CPU Waits





		last	min	avg	max
WaitStats: Running CXPACKET	[avg]	39 ms	0 ms	95.8567 ms	32734 ms
WaitStats: Running SOS_SCHEDULER_YIELD	[avg]	273 ms	0 ms	27.5571 ms	4558 ms
WaitStats: Running THREADPOOL	[avg]	0 ms	0 ms	0.002782 ms	11 ms
WaitStats: Running CXSYNC_PORT	[avg]	11 ms	0 ms	10.8748 ms	4097 ms

# Wait stats



# Wait stats

From	<input type="text" value="now-30d"/>	
To	<input type="text" value="now"/>	
<input type="button" value="Apply"/>		

Last 2 days	Yesterday	Today	Last 5 minutes
Last 7 days	Day before yesterday	Today so far	Last 15 minutes
Last 30 days	This day last week	This week	Last 30 minutes
Last 3 months	Previous week	This week so far	Last 1 hour
Last 6 months	Previous month	This month	Last 3 hours
Last 1 year	Previous year	This month so far	Last 6 hours
Last 2 years		This year	Last 12 hours
		This year so far	Last 1 day

# Wait stats

```
<item>
  <name>WaitStats: Running THREADPOOL</name>
  <type>CALCULATED</type>
  <key>waitstats.running.THREADPOOL</key>
  <delay>5m</delay>
  <history>7d</history>
  <units>ms</units>
  <params>(last(waitstats.THREADPOOL) - prev(waitstats.THREADPOOL))</params>
  <applications>
    <application>
      <name>Wait Statistics</name>
    </application>
  </applications>
</item>
```

# Wait stats

```
1 select cast('<item>' + char(13) + '<name> WaitStats: ' + wait_type + '</name>' + char(13) +
2         '<type>DEPENDENT</type>' + char(13) +
3         '<key>waitstats.' + wait_type + '</key>' + char(13) +
4         '<delay>0</delay>' + char(13) +
5         '<history>1d</history>' + char(13) +
6         '<units>ms</units>' + char(13) +
7         '<applications>' + char(13) + char(9) +
8         '<application>' + char(13) + char(9) + char(9) +
9         '<name>Wait Statistics</name>' + char(13) + char(9) +
10        '</application>' + char(13) +
11        '</applications>' + char(13) +
12        '<preprocessing>' + char(13) + char(9) +
13        '<step>' + char(13) + char(9) + char(9) +
14        '<type>JSONPATH</type>' + char(13) + char(9) + char(9) +
15        '<parameters>' + char(13) + char(9) + char(9) + char(9) +
16        '<parameter>${?(@.wait_type=='' + wait_type + '')}.wait_time_ms.first()</parameter>' + char(13) + char(9) + char(9) +
17        '</parameters>' + char(13) + char(9) + char(9) +
18        '</step>' + char(13) + char(9) +
19        '<step>' + char(13) + char(9) + char(9) +
20        '<type>CHANGE_PER_SECOND</type>' + char(13) + char(9) + char(9) + char(9) +
21        '<parameters>' + char(13) + char(9) + char(9) + char(9) +
22        '<parameter/>' + char(13) + char(9) + char(9) +
23        '</parameters>' + char(13) + char(9) + char(9) +
24        '</step>' + char(13) + char(9) +
25        '</preprocessing>' + char(13) +
26        '<master_item>' + char(13) + char(9) +
27        '<key>db.odbc.get[get_wait_stats,&quot;{<MSSQL.DSN>&quot;}</key>' + char(13) +
28        '</master_item>' + char(13) +
29        '</item>' as xml) as [dependent item],
```

# Why Zabbix?

- ▶ It might already be there in your organization
- ▶ Create your own templates
- ▶ Active community
- ▶ It's free



## More info?

- ▶ <https://github.com/reitse/Speaking>
- ▶ <https://wordpress.com/post/sqlreitse.home.blog/574>





A man and a woman are standing in a modern office environment, looking at a laptop held by the man. The woman is smiling. The office has large windows, modern furniture, and hanging lights. The image is overlaid with a semi-transparent purple/pink filter.

axians

Thank you so much for listening!

Remember to provide feedback for this session and the event as a whole.

Any questions? You can reach me at:

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