Wollt ihr das DB in Flammen sehen?

axians

Do you have important databases you need to monitor? Or do you have a number of test databases you want to monitor without breaking the bank?

Let me help you.

Zabbix is a free, open source tool mainly used for monitoring infrastructure (servers, networks etc). Most infra-admins know the tool and chances are they're using it in your organisation. But when you look at the documentation, it doesn't say much about monitoring databases. Yet the tool can do this without much additional configuration or plug-ins.

In this session I'll take along on my journey from using Zabbix as an infra monitoring tool to a SQL monitoring tool. We'll start with the basics of monitoring and what to monitor. After that we'll dive a bit deeper and add a specific monitoring for SQL Server Wait Statistics. This concept can be applied to many, if not all, other areas of intere

Check out this session and you'll walk away with some news for your infrastructure friends in your organisation. And because we all love automation I'll provide you with some scripts that make it much easier for you to start building your own specific monitoring.

Monitoring (Azure) SQL DB with Zabbix

16-09-2023

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
- Many metrics available, seperate Britney from Manowar

How?

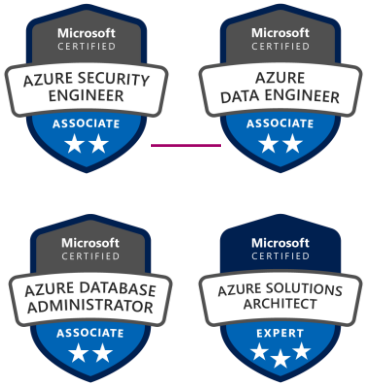
- SQL Server Management Studio or Azure Data Studio?
- There's the Azure portal…
- You can use (expensive) software
- You can try the TICK Stack
- Zabbix

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!

Reitse Eskens

Technical Consultant Axians Business Analytics



SQL: DBA, Performance tuning

Azure: architect, developer, admin

Photography, cycling,

chronical volunteer

SQL Classes

Twitter: @2meterDBA

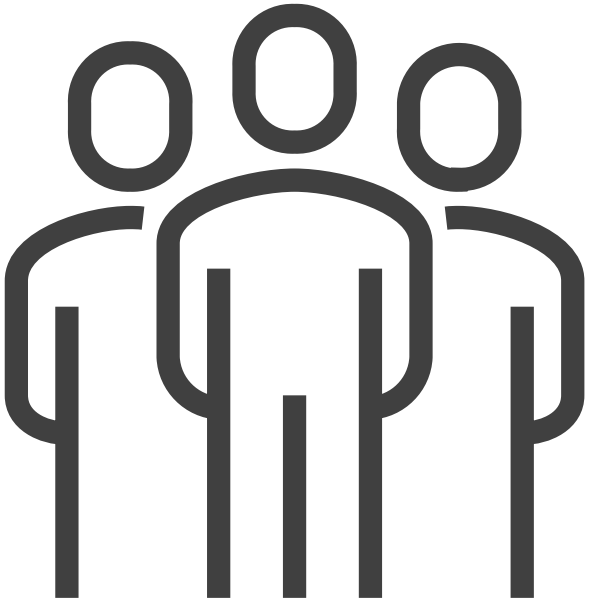
LinkedIn: /in/reitseeskens/

Bluesky: 2meterdba.bsky.social

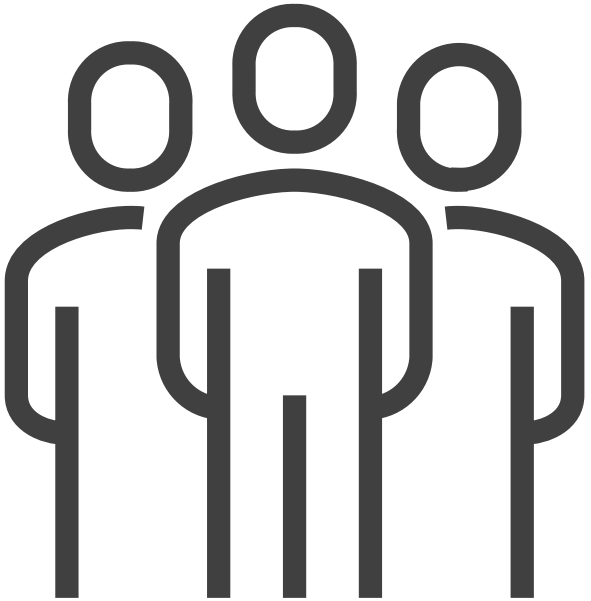
Reitse.eskens@axians.com

https://sqlreitse.com

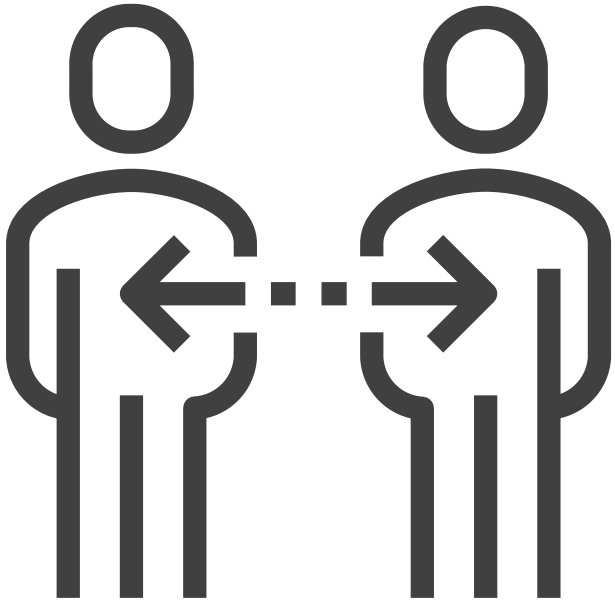
- Server infrastructure monitoring
- Runs on Linux
- Graphical interface
- Many templates from the community



- Free
- It can execute remote scripts
- It has a proxy ability
- Local agents collect the data



- 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



Global view

Edit dashboard

All dashboards / Global view

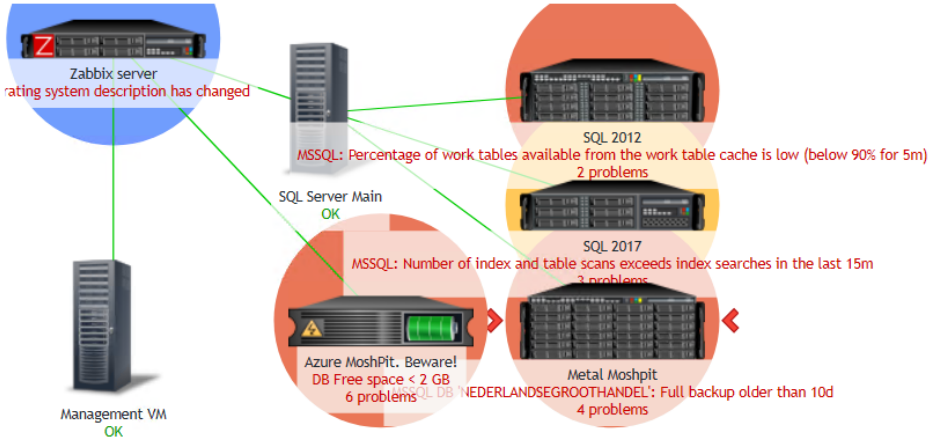
System information

Parameter	Value	Details
Zabbix server is running	Yes	localhost:10051
Number of hosts (enabled/disabled)	8	8 / 0
Number of templates	295	
Number of items (enabled/disabled/not supported)	1150	1089 / 0 / 61
Number of triggers (enabled/disabled [problem/ok])	466	465 / 1 [17 / 448]
Number of users (online)	2	1

3	0	5	8
Available	Not available	Unknown	Total

0	5	1	6	5	0
Disaster	High	Average	Warning	Information	Not classified

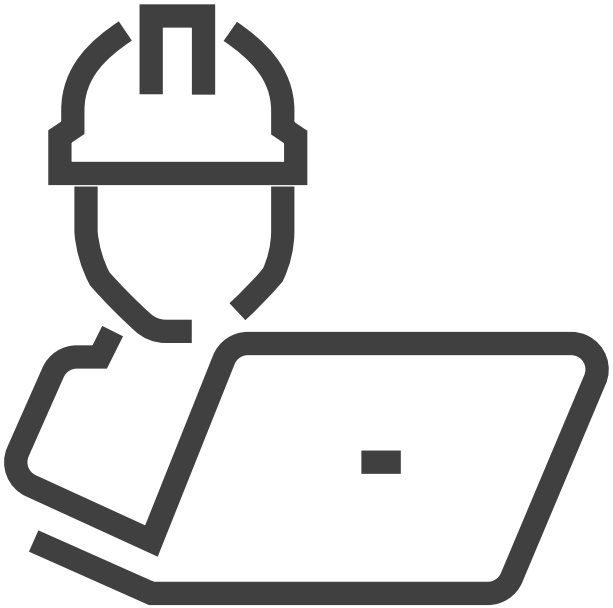
Local Hosting



Problems

Time	Info	Host	Problem • Severity	Durati
07:38:58		SQL 2017	MSSQL: Failed to fetch info data (or no data for 30m)	22m 2
07:09:03		SQL 2017	MSSQL: Percent of adhoc queries running is over 10% for 15m	52m 2
07:09:03		SQL 2017	MSSQL: Number of index and table scans exceeds index searches in the last 15m	52m 2
Today				
2023-09-11 20:21:03		Azure MoshPit. Beware!	MSSQL: Percent of adhoc queries running is over 10% for 15m	4d 11h

- 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!




DEMO!

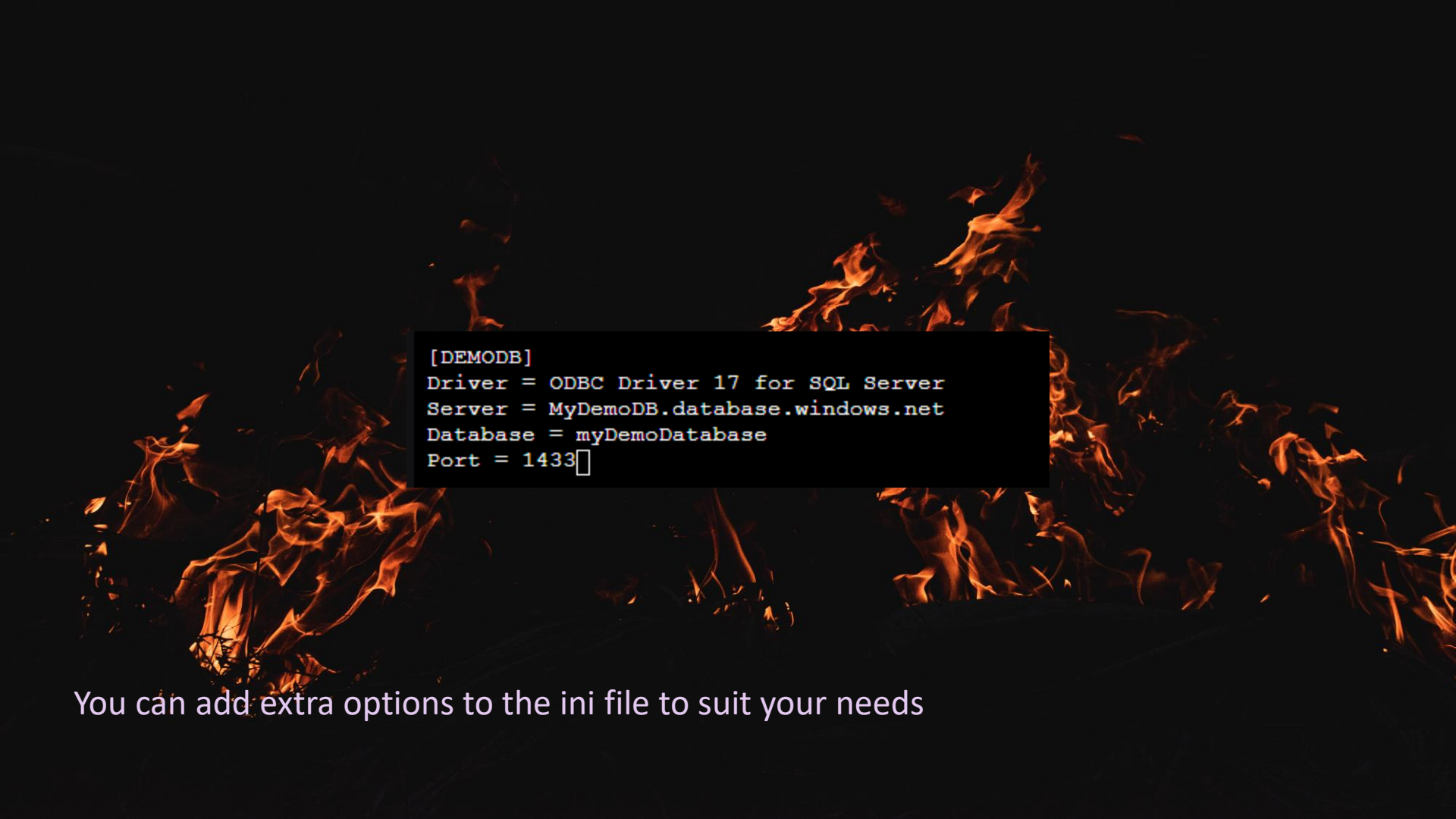
```
sudo su
curl https://packages.microsoft.com/keys/microsoft.asc | apt-key add -

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

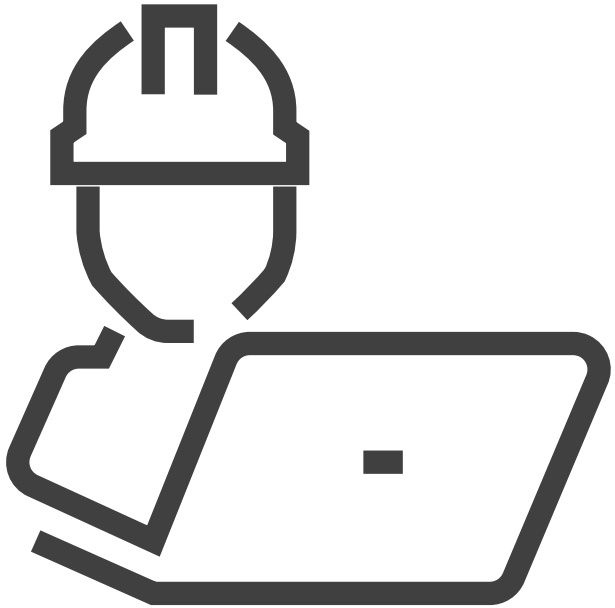
```ini
# [DSN name]
[MSSQLTest]
Driver = ODBC Driver 17 for SQL Server
# Server = [protocol:]server[,port]
Server = tcp:localhost,1433
#
# Note:
# Port is not a valid keyword in the odbc.ini file
# for the Microsoft ODBC driver on Linux or macOS
#
```

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



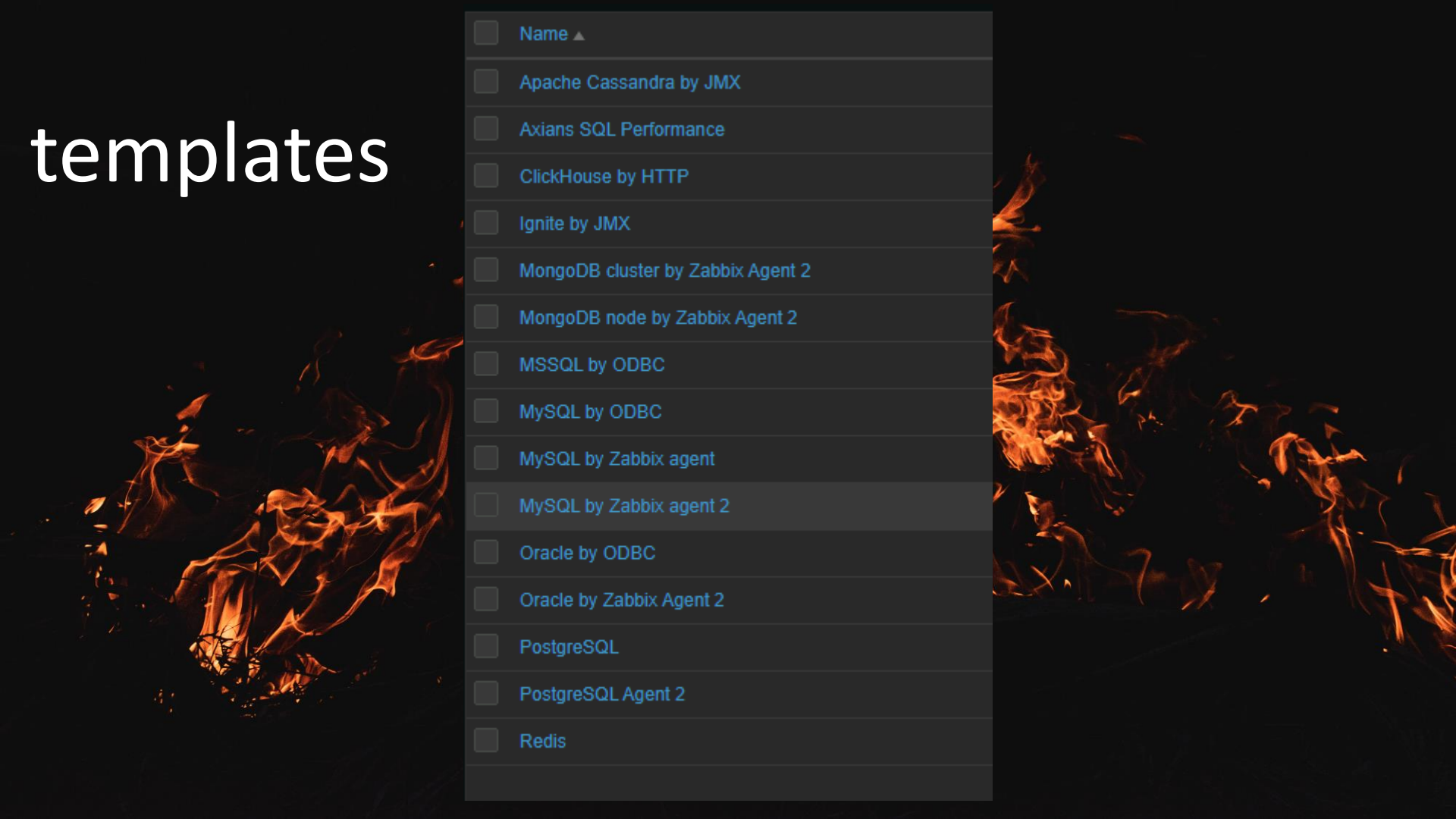
You can add extra options to the ini file to suit your needs

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




DEMO!

templates


Name ▲
Apache Cassandra by JMX
Axians SQL Performance
ClickHouse by HTTP
Ignite by JMX
MongoDB cluster by Zabbix Agent 2
MongoDB node by Zabbix Agent 2
MSSQL by ODBC
MySQL by ODBC
MySQL by Zabbix agent
MySQL by Zabbix agent 2
Oracle by ODBC
Oracle by Zabbix Agent 2
PostgreSQL
PostgreSQL Agent 2
Redis

Host

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

* Host name: MSSQLSERVER

Visible name: Metal Moshpit Bands

Templates

Name	Action
MSSQL by ODBC	Unlink Unlink and clear

type here to search — Select

* Groups: Sql Instances ✖ — type here to search — Select

Interfaces

Type	IP address	DNS name	Connect to	Port	Default
Agent	10.4.0.4	VMSQL01	IP DNS	10050	Remove

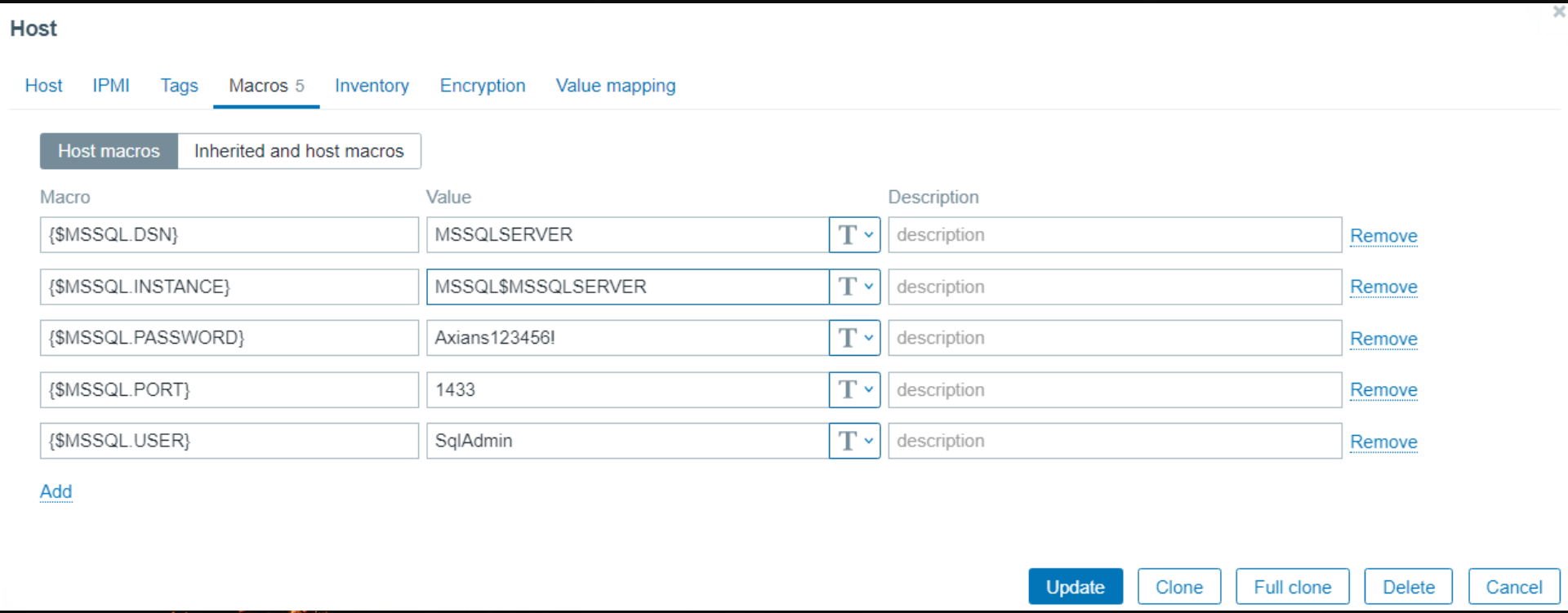
Add

Description

Monitored by proxy: (no proxy)

Enabled

Update | Clone | Full clone | Delete | Cancel



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/
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
   ```

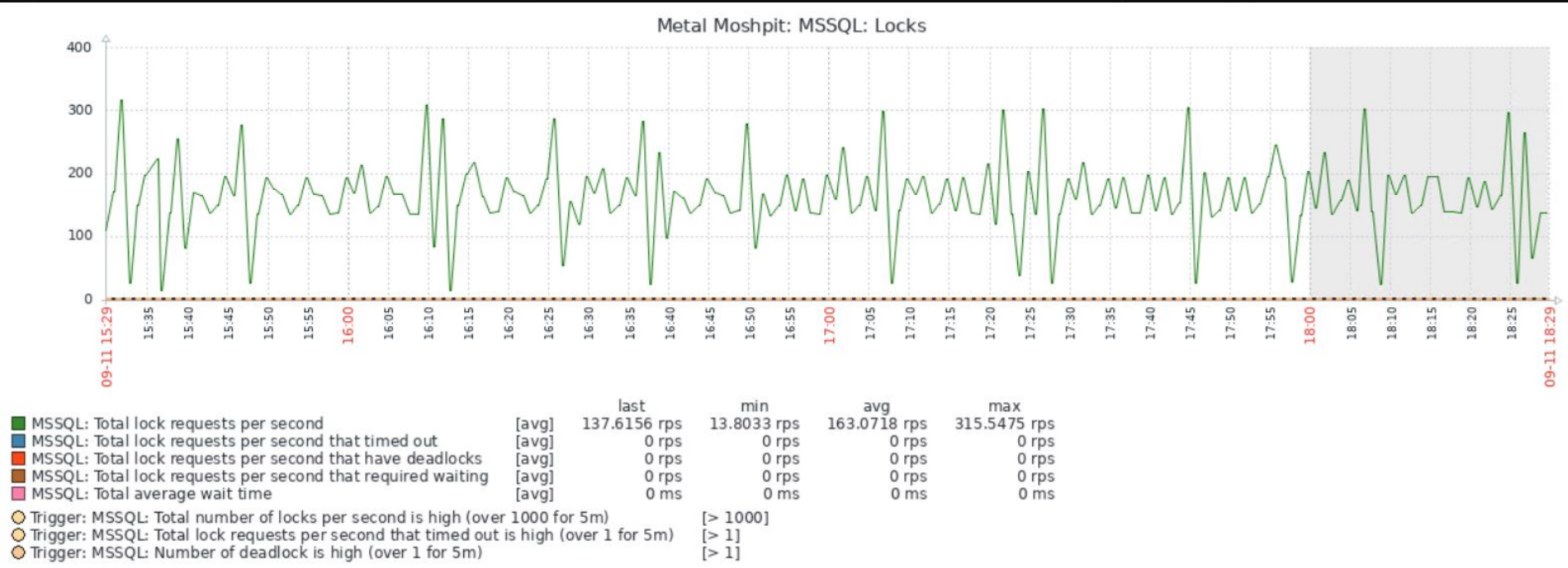
4. SYSTEMCTL RESTART APACHE2
5. SYSTEMCTL RESTART ZABBIX-SERVER

	Azure MoshPit. Beware!	Items 318	Triggers 50	Graphs 34	Discovery 7	Web	10.4.0.9:10050	Axians SQL Performance, MSSQL by ODBC	Enabled	ZBX	None
	Management VM	Items 122	Triggers 85	Graphs 16	Discovery 4	Web	10.4.0.5:10050	ICMP Ping, Windows by Zabbix agent	Enabled	ZBX	None
	Metal Moshpit	Items 177	Triggers 74	Graphs 29	Discovery 7	Web	10.4.0.4:10050	MSSQL by ODBC	Enabled	ZBX	None
	Metal Moshpit Bands	Items 72	Triggers 24	Graphs 17	Discovery 7	Web	10.4.0.4:10050	MSSQL by ODBC	Enabled	ZBX	None
	SQL 2012	Items 77	Triggers 26	Graphs 17	Discovery 7	Web	10.4.0.4:10050	MSSQL by ODBC	Enabled	ZBX	None
	SQL 2017	Items 77	Triggers 26	Graphs 17	Discovery 7	Web	10.4.0.4:10050	MSSQL by ODBC	Enabled	ZBX	None
	SQL Server Main	Items 169	Triggers 110	Graphs 34	Discovery 4	Web	10.4.0.4:10050	ICMP Ping, Windows by Zabbix agent	Enabled	ZBX	None
	Zabbix server	Items 138	Triggers 71	Graphs 28	Discovery 4	Web	127.0.0.1:10050	Linux by Zabbix agent, Zabbix server health	Enabled	ZBX	None

Displaying 8 of 8 found

Name ▲	Interface	Availability	Tags	Status	Latest data	Problems	Graphs	Dashboards	Web
Azure MoshPit. Beware!	10.4.0.9:10050	ZBX	class: database target: mssql	Enabled	Latest data	1 1 3 1	Graphs 34	Dashboards 5	Web
Management VM	10.4.0.5:10050	ZBX	class: os target: windows	Enabled	Latest data	Problems	Graphs 16	Dashboards 2	Web
Metal Moshpit	10.4.0.4:10050	ZBX	class: database target: mssql	Enabled	Latest data	3 3	Graphs 29	Dashboards	Web
Metal Moshpit Bands	10.4.0.4:10050	ZBX	class: database target: mssql	Enabled	Latest data	1	Graphs 17	Dashboards	Web
SQL 2012	10.4.0.4:10050	ZBX	class: database target: mssql	Enabled	Latest data	1 1	Graphs 17	Dashboards	Web
SQL 2017	10.4.0.4:10050	ZBX	class: database target: mssql	Enabled	Latest data	2 1	Graphs 17	Dashboards	Web
SQL Server Main	10.4.0.4:10050	ZBX	class: os target: windows	Enabled	Latest data	Problems	Graphs 34	Dashboards 2	Web
Zabbix server	127.0.0.1:10050	ZBX	class: os class: software target: linux •••	Enabled	Latest data	1	Graphs 28	Dashboards 4	Web

Displaying 8 of 8 found



		last	min	avg	max
MSSQL: Total lock requests per second	[avg]	137.6156 rps	13.8033 rps	163.0718 rps	315.5475 rps
MSSQL: Total lock requests per second that timed out	[avg]	0 rps	0 rps	0 rps	0 rps
MSSQL: Total lock requests per second that have deadlocks	[avg]	0 rps	0 rps	0 rps	0 rps
MSSQL: Total lock requests per second that required waiting	[avg]	0 rps	0 rps	0 rps	0 rps
MSSQL: Total average wait time	[avg]	0 ms	0 ms	0 ms	0 ms

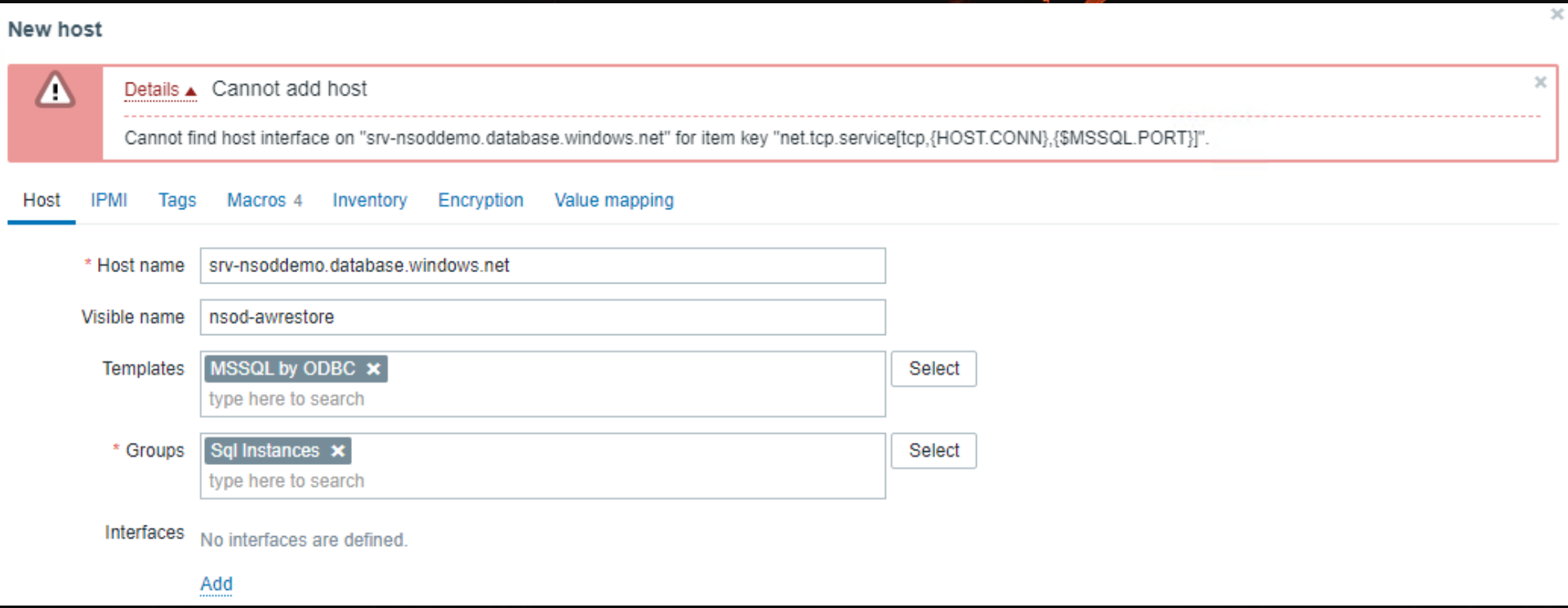
Trigger: MSSQL: Total number of locks per second is high (over 1000 for 5m) [> 1000]
Trigger: MSSQL: Total lock requests per second that timed out is high (over 1 for 5m) [> 1]
Trigger: MSSQL: Number of deadlock is high (over 1 for 5m) [> 1]


DEMO!

Connection

```
# [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 = MoshPit
Port = 1433
```

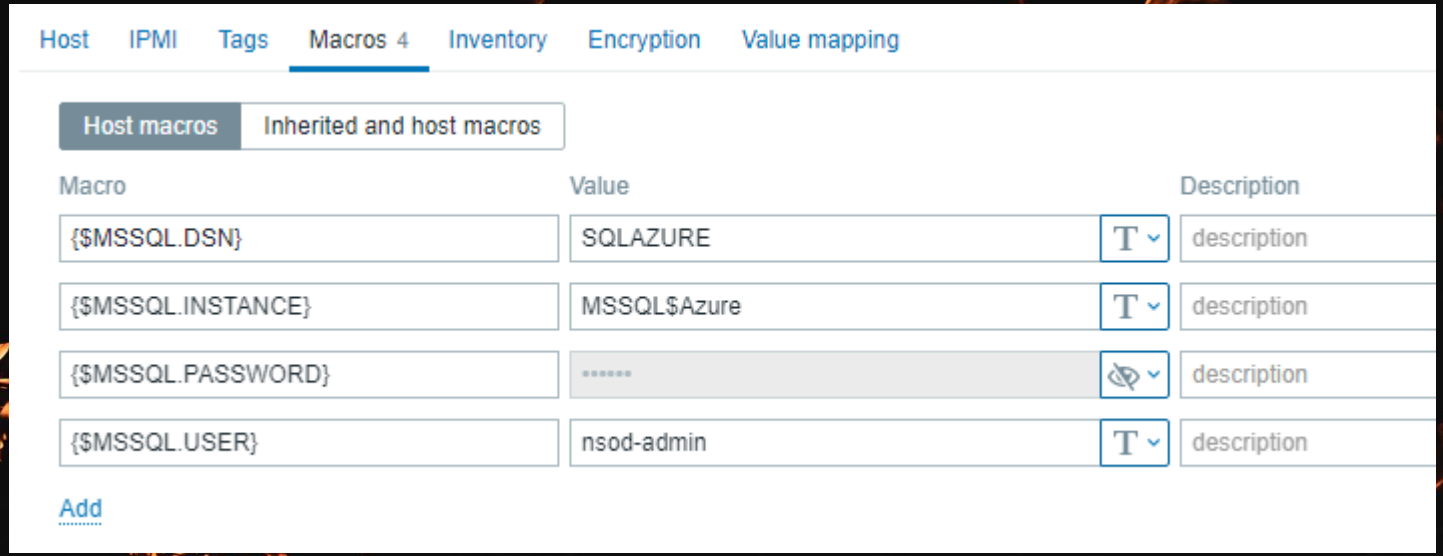
Connection


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
srv-nsoddemo.database.windows.net
Visible name
nsod-awrestore
Templates
MSSQL by ODBC
type here to search
Select
* Groups
Sql Instances
type here to search
Select
Interfaces
No interfaces are defined.
Add

Connection

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

Connection


Host
IPMI
Tags
Macros 4
Inventory
Encryption
Value mapping
Host macros
Inherited and host macros
Macro
Value
Description
{$MSSQL.DSN}
SQLAZURE
description
{$MSSQL.INSTANCE}
MSSQL$Azure
description
{$MSSQL.PASSWORD}
description
{$MSSQL.USER}
nsod-admin
description
Add

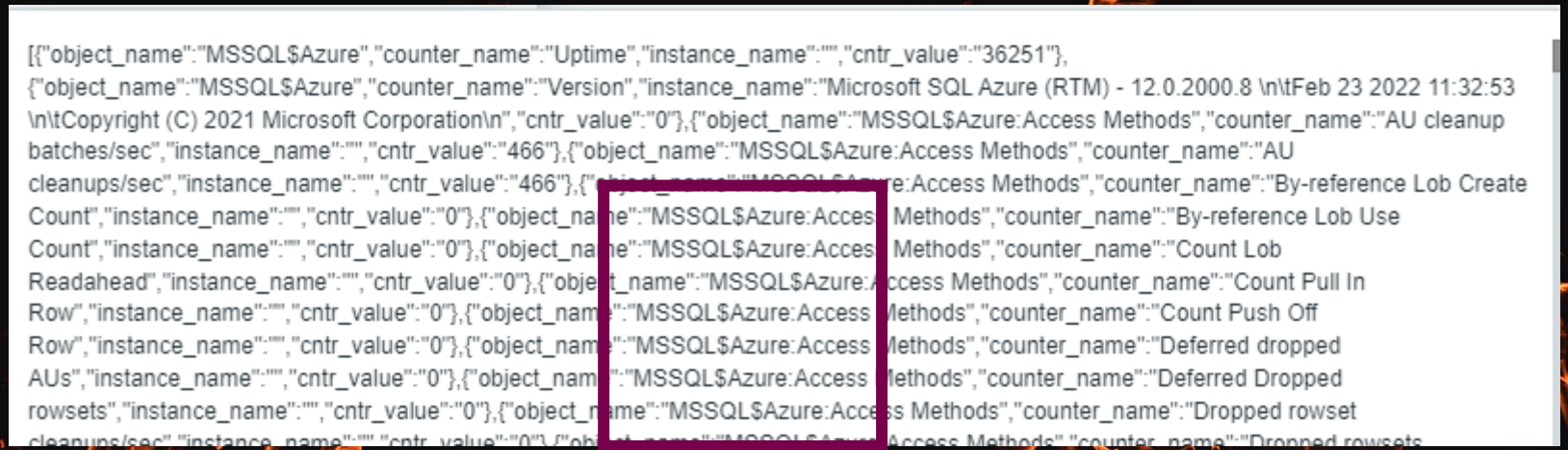
Incomplete data

Change the query

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

```
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
FROM sys.dm_os_performance_counters
UNION
SELECT '{$MSSQL.INSTANCE}' as object_name,'Version' as counter_name,@@version as instance_name,0 as cntr_value
UNION
SELECT '{$MSSQL.INSTANCE}' as object_name,'Uptime' as counter_name,'' as instance_name,DATEDIFF(second,sqlserver_start_time,GETDATE()) as cntr_value
FROM sys.dm_os_sys_info
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 \n\tFeb 23 2022 11:32:53
\n\tCopyright (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

Not everything is supported on Azure

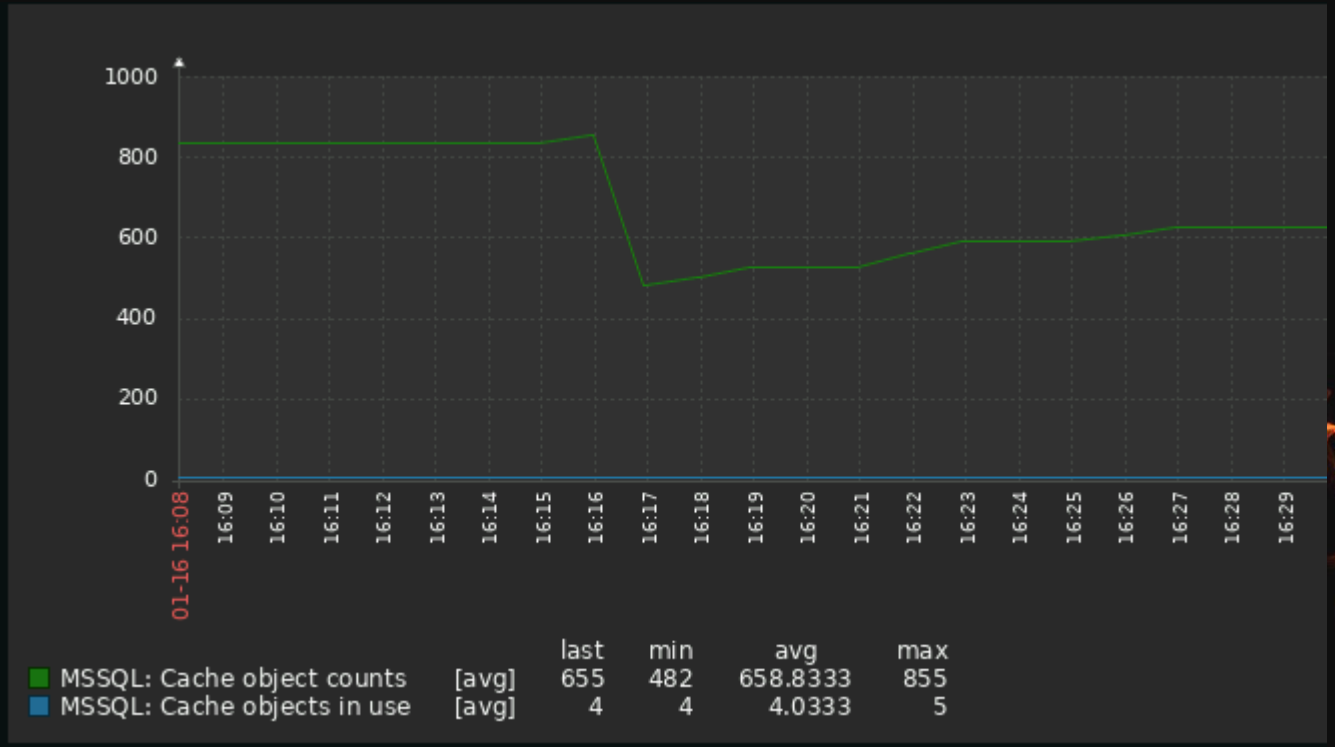
Name ▲	Interval	Type	Status	Info
MSSQL by ODBC: Availability groups discovery	1h	Database monitor	Not supported	i
MSSQL by ODBC: Database discovery	1h	Database monitor	Enabled	
MSSQL by ODBC: Local database discovery	1h	Database monitor	Not supported	i
MSSQL by ODBC: Mirroring discovery	1h	Database monitor	Not supported	i
MSSQL by ODBC: Non-local database discovery	1h	Database monitor	Not supported	i
MSSQL by ODBC: Replication discovery	1h	Database monitor	Not supported	i

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

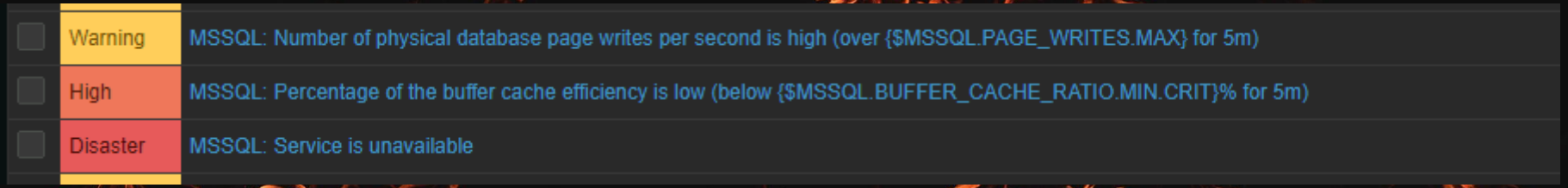
Items

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

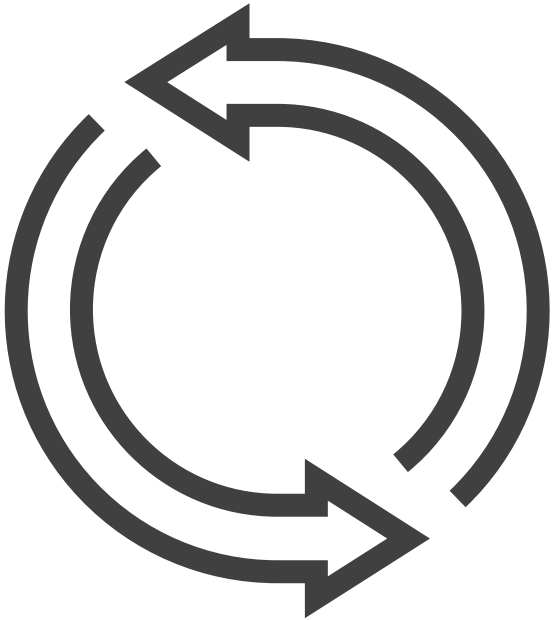
Items


1000
800
600
400
200
0
01-16 16:08
16:09
16:10
16:11
16:12
16:13
16:14
16:15
16:16
16:17
16:18
16:19
16:20
16:21
16:22
16:23
16:24
16:25
16:26
16:27
16:28
16:29
last min avg max
MSSQL: Cache object counts [avg] 655 482 658.8333 855
MSSQL: Cache objects in use [avg] 4 4 4.0333 5

Triggers

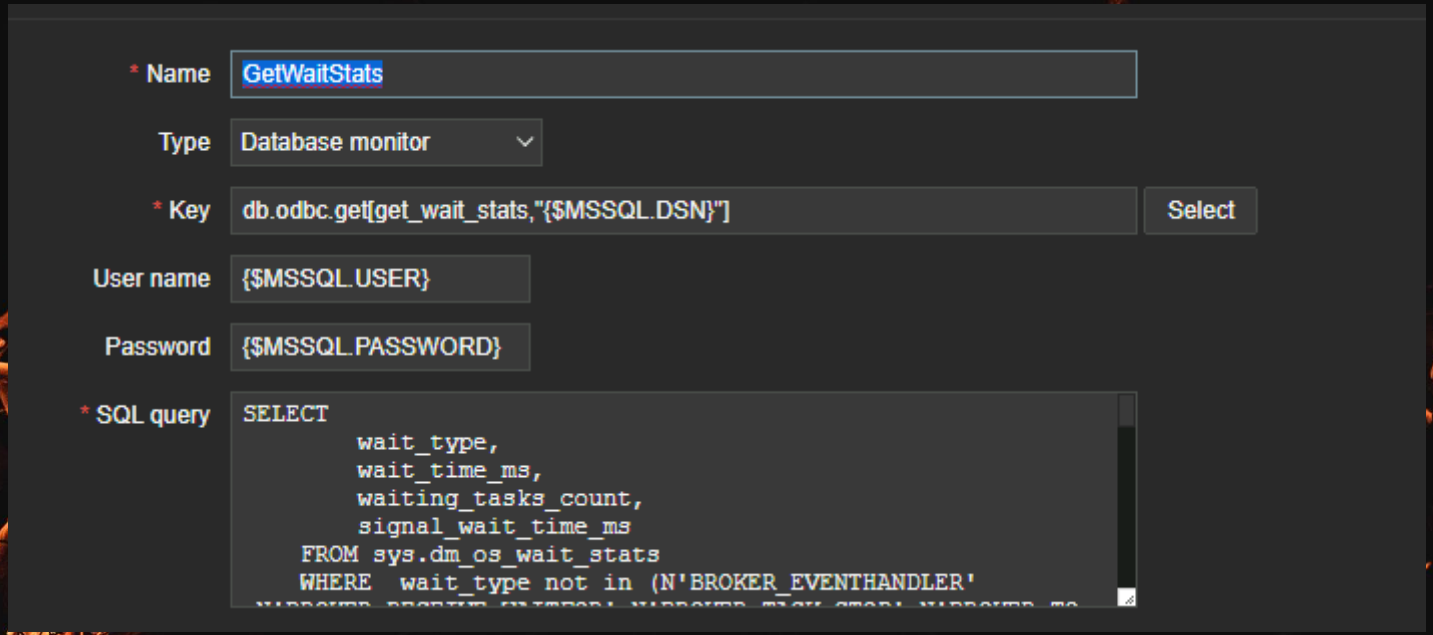

Warning
MSSQL: Number of physical database page writes per second is high (over {$MSSQL.PAGE_WRITES.MAX} for 5m)
High
MSSQL: Percentage of the buffer cache efficiency is low (below {$MSSQL.BUFFER_CACHE_RATIO.MIN.CRIT}% for 5m)
Disaster
MSSQL: Service is unavailable

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

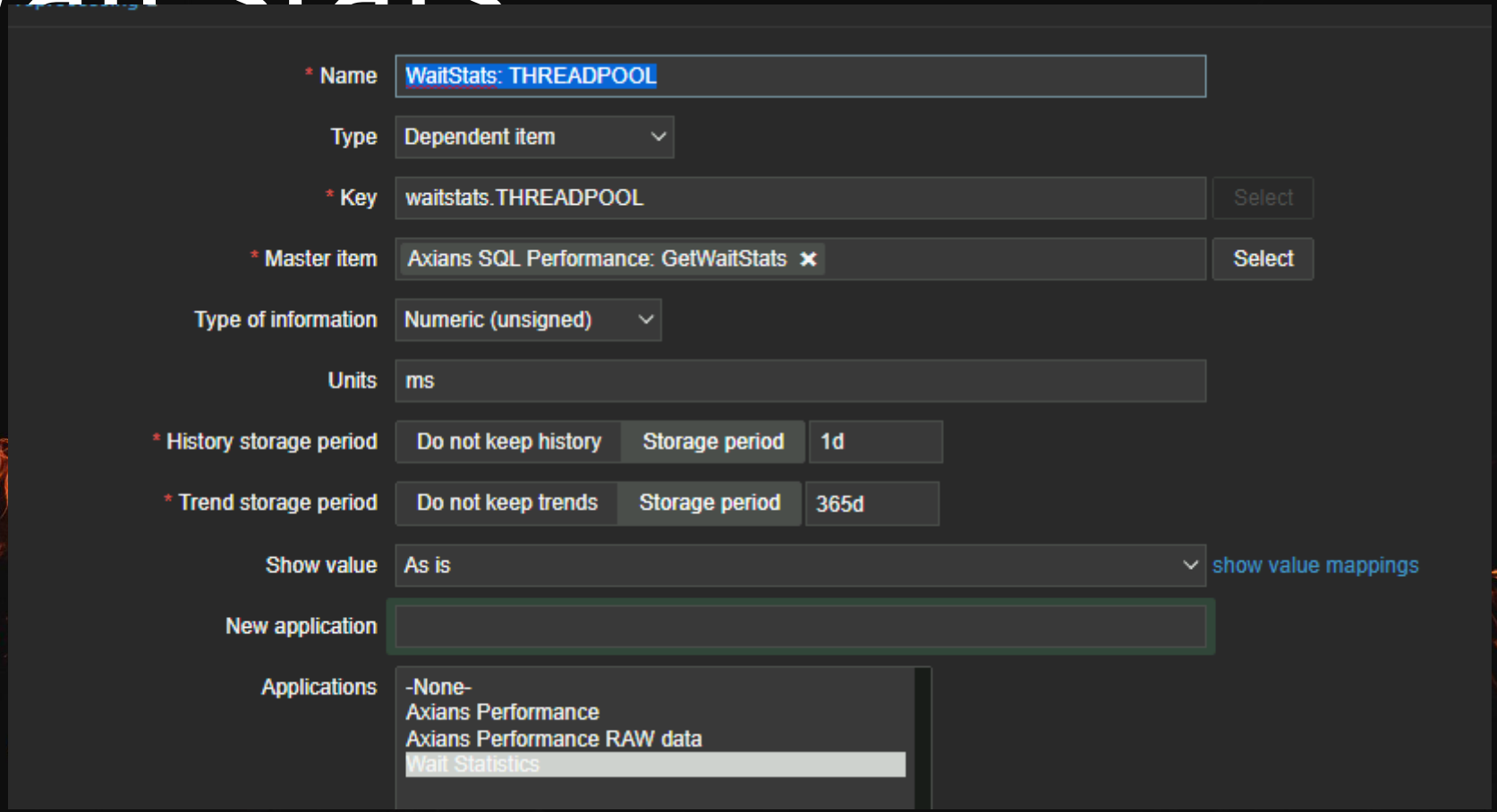



DEMO!

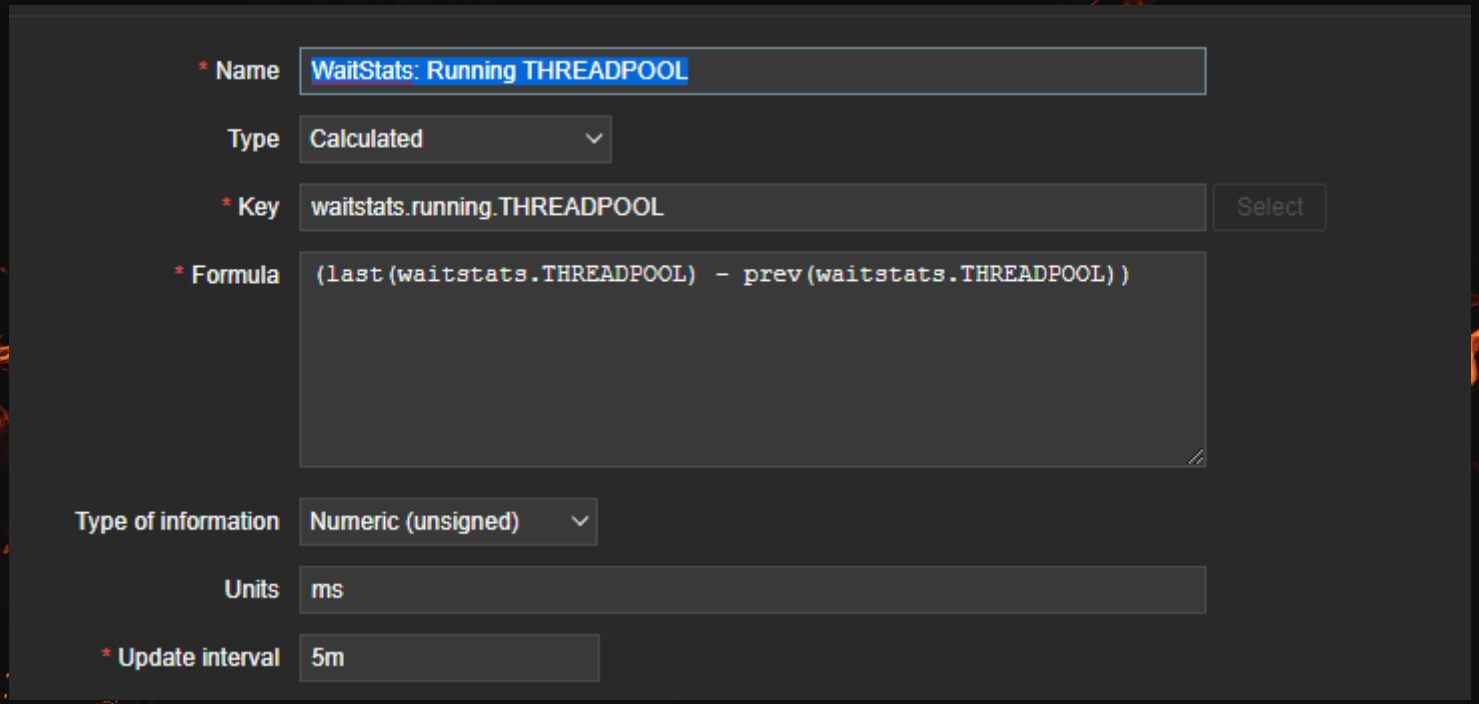
Wait stats


* 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 (N'BROKER_EVENTHANDLER'

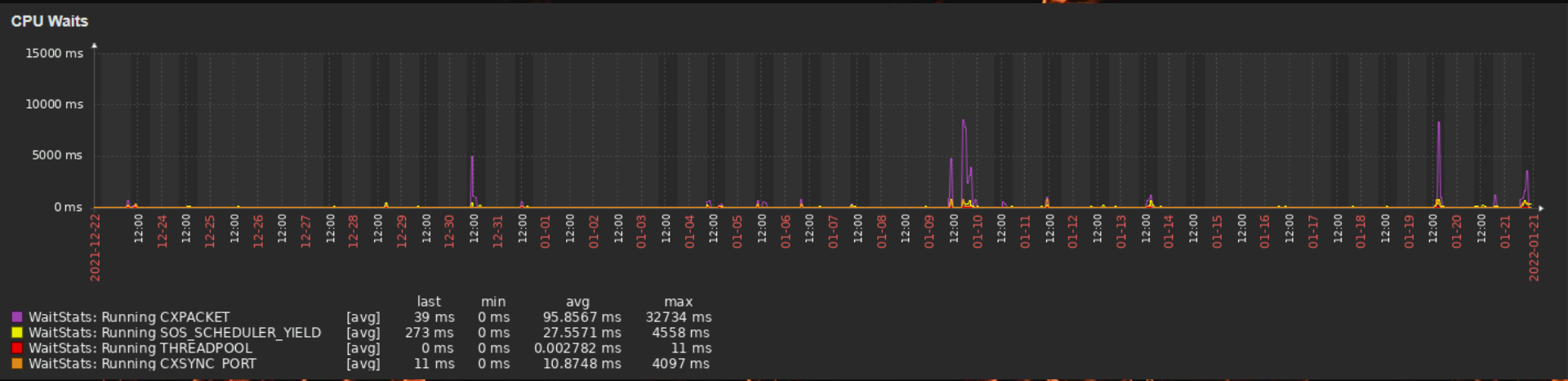
Wait stats


* 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
show value mappings
New application
Applications
-None-
Axians Performance
Axians Performance RAW data
Wait Statistics

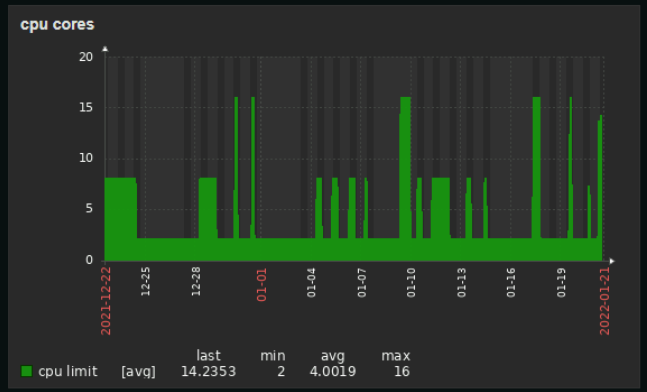
Wait stats

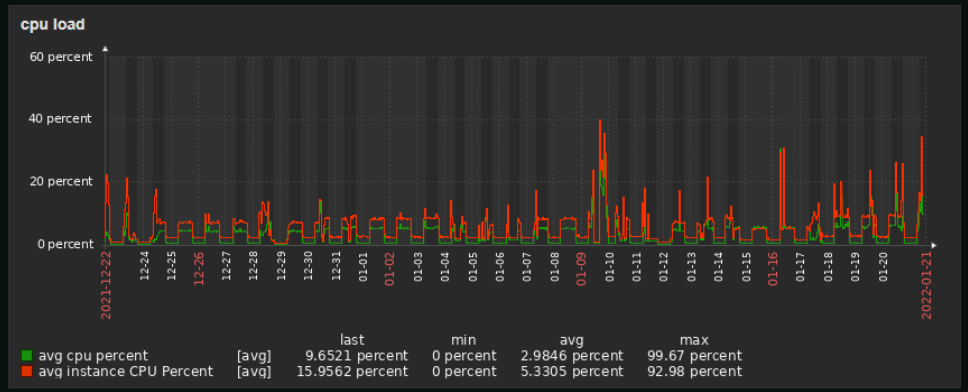

* Key
waitstats.THREADPOOL
* Name
WaitStats: Running THREADPOOL
Type
Calculated
* Key
waitstats.running.THREADPOOL
Select
* Formula
(last(waitstats.THREADPOOL) - prev(waitstats.THREADPOOL))
Type of information
Numeric (unsigned)
Units
ms
* Update interval
5m

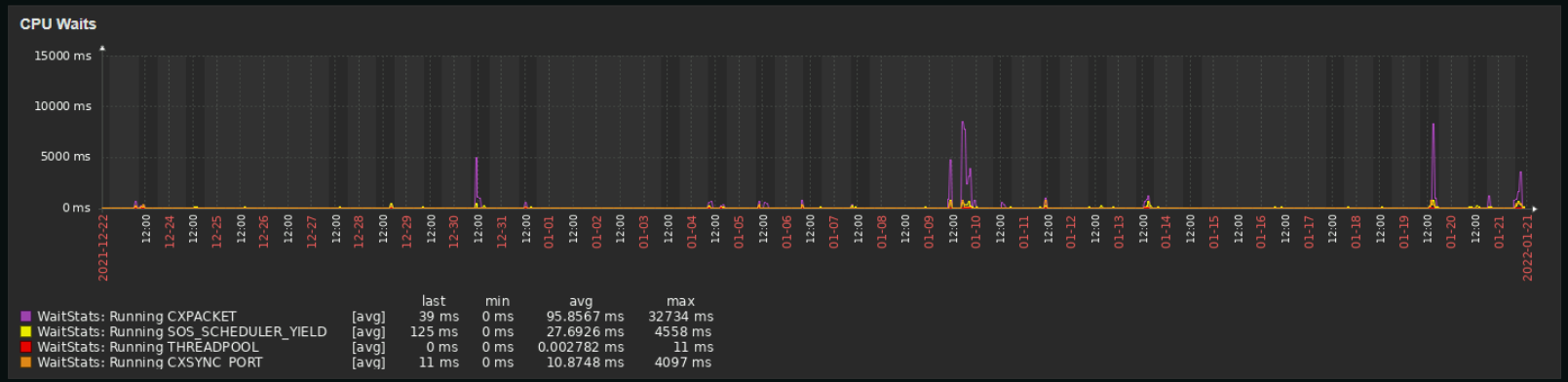
Wait stats


CPU Waits
15000 ms
10000 ms
5000 ms
0 ms
2021-12-22
2022-01-21
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

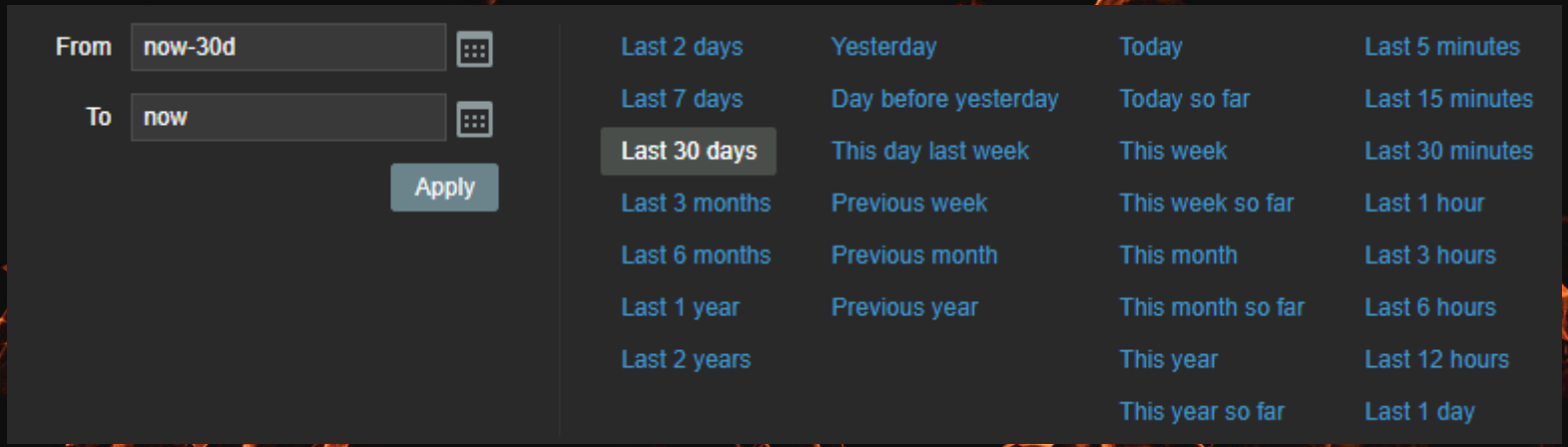
Wait stats


cpu cores
20
15
10
5
0
2021-12-22
12-25
12-28
01-01
01-04
01-07
01-10
01-13
01-16
01-19
2022-01-21
last min avg max
cpu limit [avg] 14.2353 2 4.0019 16


cpu load
60 percent
40 percent
20 percent
0 percent
2021-12-22
12-24
12-25
12-26
12-27
12-28
12-29
12-30
12-31
01-01
01-02
01-03
01-04
01-05
01-06
01-07
01-08
01-09
01-10
01-11
01-12
01-13
01-14
01-15
01-16
01-17
01-18
01-19
01-20
2022-01-21
last min avg max
avg cpu percent [avg] 9.6521 percent 0 percent 2.9846 percent 99.67 percent
avg instance CPU Percent [avg] 15.9562 percent 0 percent 5.3305 percent 92.98 percent


CPU Waits
15000 ms
10000 ms
5000 ms
0 ms
2021-12-22
12-24
12-25
12-26
12-27
12-28
12-29
12-30
12-31
01-01
01-02
01-03
01-04
01-05
01-06
01-07
01-08
01-09
01-10
01-11
01-12
01-13
01-14
01-15
01-16
01-17
01-18
01-19
01-20
01-21
2022-01-21
last min avg max
WaitStats: Running CXPACKET [avg] 39 ms 0 ms 95.8567 ms 32734 ms
WaitStats: Running SOS_SCHEDULER_YIELD [avg] 125 ms 0 ms 27.6926 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


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

```
select cast('<item>' + char(13) + '<name> WaitStats: ' + wait_type + '</name>' + char(13) +
        '<type>DEPENDENT</type>' + char(13) +
        '<key>waitstats.' + wait_type + '</key>' + char(13) +
        '<delay>0</delay>' + char(13) +
        '<history>1d</history>' + char(13) +
        '<units>ms</units>' + char(13) +
        '<applications>' + char(13) + char(9) +
        '<application>' + char(13) + char(9) + char(9) +
        '<name>Wait Statistics</name>' + char(13) + char(9) +
        '</application>' + char(13) +
        '</applications>' + char(13) +
        '<preprocessing>' +char(13) + char(9) +
        '<step>' + char(13) + char(9) + char(9) +
        '<type>JSONPATH</type>' + char(13) + char(9) + char(9) +
        '<parameters>' + char(13) + char(9) + char(9) +char(9) +
        '<parameter>$[?(@.wait_type==''' + wait_type + ''')].wait_time_ms.first()</parameter>' + char(13) + char(9) + char(9) +
        '</parameters>' + char(13) + char(9) + char(9) +
        '</step>' +char(13) + char(9) +
        '<step>' + char(13) + char(9) + char(9) +
        '<type>CHANGE_PER_SECOND</type>'  + char(13) + char(9) + char(9) +
        '<parameters>'  + char(13) + char(9) + char(9) +char(9) +
        '<parameter/>' + char(13) + char(9) + char(9) +
        '</parameters>' + char(13) + char(9) + char(9) +
        '</step>' +char(13) + char(9) +
        '</preprocessing>' +char(13) +
        '<master_item>' + char(13) + char(9) +
        '<key>db.odbc.get[get_wait_stats,&amp;quot;{$MSSQL.DSN}&amp;quot;]</key>' +char(13) +
        '</master_item>' + char(13) +
        '</item>' as xml) as [dependent item],
```


DEMO!

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://sqlreitse.com/2021/08/26/monitoring-sql-server-with-zabbix/

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