Basic monitoring of MS SQL servers' performance on Windows OS is realized by performance counters. There's a large number of them, we've selected a few of the most important ones and we also add configuration procedure for monitoring of any custom performance counter.

1. SQL Memory, Page splits, users v1.1 (template)

SQL Total Memory - currently used memory by the SQL server (from dedicated RAM)

SQL Target memory - **dedicated** max. RAM for the SQL server, this value can be found in the Task Manager

SQL Memory Usage % - percentage of the currently used RAM from a target value (if it's near 100%, it means you need to add RAM to the server)

SQL Page splits / sec - it's a specific amount of operations per second at memory management by the SQL server. If the values in cells exceed a certain size, the SQL server must split them among several memory pages - hence the name "Page split". If it happens too often, it slows down the SQL server's operation. (*indicatively, even a few dozens for a few GB database is a bad number*). This can be removed by maintenance of the SQL server by an SQL specialist

SQL User connections - number of connections to the SQL server, for you to be able to tell if the performance parameters are adequate to number of users

Setup can be found be below in the article

2. SQL Transactions and Deadlocks v1.1. (template)

SQL Active Transactions - one or more changes actively executed in the database at the time of value reading. It's a field, for which you should choose limit values empirically, since it depends on the application.

 $\ensuremath{\mathsf{SQL}}$ Deadlocks - deadlock occurs, when two processes try to update the same record or a record file

Setup can be found be below in the article

3. Custom performance counter

It's possible to monitor any other performance counter using the Watch condition Performance counter.

An example of setup is given below in the article

Monitoring setup through templates

Both Watches from the above stated templates are configured directly on the WIN server with SQL server. You must enter its name or instance into the wizard. It's the only parameter that you will enter. Reading of the very performance counters happens directly on OS with the SQL server.

The following images capture the most important setup steps. The others are very similar to other Watches.

1. Setup of Watch through template SQL Memory, Page splits, users



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The template is desctribed in <u>introduction of the article</u>, and we only further describe important points of setup .

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Add condition for "S	QL performance 1"	
Add containant of the second s	Health of systems EventLog Events Count (for Windows Vista and newer) Free space on disk Service status Loaded Device Driver Running process E-Mail looping test (SMTP -> POP3) Ping RTT (response time) Ping packet loss Files size in directory Files size in directory Start / Restart OS Windows running time Hardware Monitoring HVW monitoring of server (HP, DELL, FUJITSU) LINUX monitoring Environment Monitoring (snmp) Environment Monitoring (http) Preddefined health templates 	Security Aunning user process Unauthorized admin process LoggedOn user Time limitations Date Day of Week Day of Week Time Range SNMP SNMP CHAT Variable CHAT Numeric Variable CHAT Vector Variable CHAT Vector Variable Watch state
Current IP Network presented Kext >		Cancel

Image: Výber šablóny k meraniu obsadenia RAM, počet operácií Page splits /sec, počet aktívnych SQL spojení.



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Watch Wizar	and the second	
SQL N	/lemory, Page splits, Users v1.1	
Script Name		
SQL Memory,	, Page splits, Users v1.1	
Script		
Parameter	Value	
Sql instance	SQLSERVER or MSSQL\$NAME	
l		
Help		Test, Edit Script
Operation	Test Period Unit	
Successful	▼ 5 min ▼	
Value from	this condition send to UM server	
Always		
Never		
Acres the	a state of watch	
W22622 (Ne	state or watch	
Back	Next >	Cancel
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Image: Políčko pre zadanie názvu SQL servera alebo inštancie v rámci sprievodcu (pre znovu otvorenie tohto dialógu urobte dvojité kliknutie na prvú podmienku v CHATe)

Name selection for the SQL instance, it's usually SQLSERVER for the first one, and for the other it's usually MSSQL\$instance_name.



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	- W	310	h W	17300
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C	onditions for "SQL performance 1"									
1	1 Successful CHAT SQL Memory, Page splits, Users v1.1 Check every 5min None value will be sent to CM Server									
2	2 CHAT Var. "TotalMem" (SQL Total Memory kB) > 0 Check on each watch state evaluation Value will be sent to CM Server only if change to last sent value is more than 50000									
3	3 CHAT Var. "TargetMem" (SQL Target Memory kB) > 0 Check on each watch state evaluation Value will be sent to CM Server only if change to last sent value is more than 50000									
4	CHAT Var. "MemUsage" (SQL Memory Usage %) < 102 Check on each watch state evaluation Value will be sent to CM Server only if change to last sent value is more than 5									
5	CHAT Var. "PageSplits" (SQL Page splits / sec) < 250 Check on each watch state evaluation Value will be sent to CM Server only if change to last sent value is more than 20									
6	CHAT Var. "UserCon" (SQL User connections) < 300 Check on each watch state evaluation Value will be sent to CM Server only if change to last sent value is more than 3									
A	Add Condition Delete Condition									
State	of watch is OK if all conditions are true FAIL - if at least one condition is false									
🔽 De	elay for FAIL state. Conditions for FAIL state must be met at least 2									
Sho	ow Advanced Options									
	\wedge									
Note:	Watches are active from 5 min after the operating system start									
< E	Back Next > Skip Actions >>	Cancel								

Image: Dokončenie nastavenia Watchu môžete spraviť s definovaním akcií alebo ich preskočiť.

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	4									

Image: Ukážka z Watchu zo šablóny SQL Memory, Page splits, users

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2. Setup of Watch through template SQL Transactions and Deadlocks

The template is desctribed in <u>introduction of the article</u>, and we only further describe important points of setup .

G Watch Wizard		
Add condition for "S	SQL performance 1"	
Performance Memory usage CPU usage Disk activity Disk read / write queue length Network adapter usage Process usage (memory, CPU) Performance counters Transfered speed in LAN, Harddrives Transfered speed of FTP Internet IP trafic (transfer speed) Internet IP trafic (transfer speed) Internet IP trafic (transfer speed) Internet IP transfered data Preddefined performance templates General performance v1.0 MS SQL Query with table resp.time v1.0 SQL Memory, Page splits, Users v1.1 Terminal active sessions PUP3 HTTP, HTTPS Exists file Exists directory Current IP	Health of systems EventLog Events Count (for Windows Vista and newer) Free space on disk Service status Loaded Device Driver Running process E-Mail looping test (SMTP -> POP3) Ping RTT (response time) Ping packet loss File size Files size in directory Files count in directory Start / Restart OS Windows running time Hardware Monitoring HW monitoring of server (HP, DELL, FUUITSU) Environment Monitoring (snmp) Preddefined health templates	Security Running user process Unauthorized admin process LoggedOn user Date Date Day of Week Time Range SNMP SNMP CHAT Variable CHAT Variable CHAT Variable CHAT Variable Watch state
Network presented Sack Next>		Cancel

Image: Výber šablóny k meraniu počtu SQL transakcií, deadlockov a kontrola služieb



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Watch Wizard	Constitution page of	A marrie and		
SQL Trans. and	Deadlocks v1.1			
Script Name SQL Trans. and Deadlocks v1.1 Script Parameter Value Sql instance SQLSERVER or MSSQ	L\$NAME			
Operation Test Period Unit Successful 👻 1 min	•		Test, Edit	Script
Value from this condition send t Always Never	o CM server			
Assess the state of watch				Cancel

Image: Políčko pre zadanie názvu SQL servera alebo inštancie v rámci sprievodcu (pre znovu otvorenie tohto dialógu urobte dvojité kliknutie na prvú podmienku v CHATe)

Name selection for the SQL instance, it's usually SQLSERVER for the first one, and for the other it's usually MSSQL\$instance_name.



G	Wa	tch Wizard							
	C	onditions for "SQL Performance Counters 02"							
	1	Successful CHAT SQL Trans. and Deadlocks v1.1 Check every 1min Each value will be sent to CM Server							
	2	CHAT Var. "ActivTrans" (SQL Active Transactions) < 1000 Check on each watch state evaluation Value will be sent to CM Server only if change to last sent value is more than 5							
	3	3 CHAT Var. "DeadLocks" (SQL deadlocks / sec) < 10 Check on each watch state evaluation Each value will be sent to CM Server							
	4	Service Status "MSSQLSERVER" is "Running" Check on each watch state evaluation Each value will be sent to CM Server							
	5	Service Status "SQLBrowser" is "Running" Check on each watch state evaluation Each value will be sent to CM Server							
	A	dd Condition Delete Condition							
St	ate o	of watch is OK if all conditions are true FAIL - if at least one condition is false							
	De	ay for FAIL state. (Useful for supressing short term FAIL state)							
	Sho	w Advanced Options							
N	ote:	Watches are active from 5 min after to operating system start							
	< B	ack Next > Skip Actions >> Cancel							

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Image: Dokončenie nastavenia Watchu môžete spraviť s definovaním akcií alebo ich preskočiť.

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Image: Ukážka z Watchu zo šablóny SQL transactions and Deadlocks

3. Setup of performance counters for monitoring of SQL of custom choice

Setup is realized by direct configuration of a Watch without the wizard. After opening the Watch and dialog for adding condition, choose the condition **Performance counter**. Then find the required Watch. To hepl you find it, we give you a hint that counters for SQL are among other counters, in alphabetical order, starting with name of the SQL instance. For a single or the first instance, it's SQLSERVER, for other instances it's MSSQL\$instance_name.

After selection of the counter, you must choose a unit of the expected value. Unfortunately, you must choose it manually, because it cannot be read from the system, it's usually just a part of the counter's description in different forms. On the other hand, you get an option to convert the value from the counter to a more acceptable number (e.g. from high, difficultly read numbers in Bytes, to smaller, easily read MB or GB). Then enter a Friendly name, which will appear on CM Portal, and which you should choose to know what you're monitoring.



Image: Postup k vytvoreniu Watchu na sledovanie zvoleného countra bez sprievodcu



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Image: Výber performance countra v systémovom dialógu



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[New Watch				
	Conditions Ad	vanced		1	
	Name (Desc	ription)		Short Name	
	E Fashlad				
ŝ	IV Enabled			M Show in Into Panel	
	- 40 ×	Condition Definition			
	Con	Filter	_	Performance Counter	
į		File Size			
		Files Size in Directory	_	Counter Path MSS0I \$CZE-Database Mirroring\Butes Sent/sec	
		Files Count in Directory		Counter Unit Unit Counter Unit is unit in which is provided value of	
		Exists Directory		ke selected counter and usually is included in the	_
,		Directory Accessible		counter path / description k.g. for Network Interfa Nastavte rovnakú jednotku alebo	
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l		Windows Running Time		(Musia byt rovnakeno typu)	
l	State of wa	Operating System started		GB	_
	🔵 ОК 👔	Date Date of Week		kB/s Value(s) Unit	
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ŧ	While state o	TimeRange		kb Test Period Unit	
]	If state of the	Current IP		b/s	
¢	✓ If state of	Performance Counter		Mb/s s condition send to CM server	
2	Delay for	Ping		s ges more than	
5	E Deldy for	Ping RoundTripTime		C Always	
2	Note: Watel	Ping Packet Loss		C Never	
ł	Edit with V	SMTP PDP3		C Assess the state of watch	
,		HTTP, HTTPS			
(III	-lfa	HTTP, HTTPS Response Time	T		
	- 11 0	17 (0)			
				OK Cancel	

Image: Voľba jednotky performance countra a jednotky na zobrazenie v CM (s automatickým prepočtom jednotiek)

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Filter	Performance Counter
Filter CPU Usage Disk Activity Disk Queue Length Network Adapter Usage Internet IP Traffic Internet IP Traffic Internet IP Transferred Data Free Space On Disk Exists File File Size Files Size in Directory Files Count in Directory Exists Directory	Performance Counter Counter Path \MSSQL\$CZE:Database Mirroring\Bytes Sent/sed Counter Unit Note: Counter Unit is unit in which is provided value of B/s the selected counter and usually is included in the counter path / description. e.g. net "\Network Inter Counter Unit must be Prepočet z B/sec na MB/s Friendly Name DB Mirroring Sent data Operator Value 5 MB/s On Counter Error Test Period Unit
Directory Accessible LoggedOn User User Inactivity Time Windows Running Time Operating System started Date Day of Week Time TimeRange Current IP Performance Counter	Value = ERROR, result False Value from this condition send to CM server Value changes more than 0.01 MB/s Always Never Assess the state of watch
	OK Cancel

Image: Príklad : Nastavený counter, ktorý má jednotku B/s, ale zobrazenie v CM Portáli bude v MB/sec pod zrozumiteľnejším Friendly názvom a do CM Servera bude posielaná hodnota len, keď sa zmení aspoň o 10kB/sec a malé zmeny zbytočne neplnia databázu v CM Server



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	4										

Image: Ukážka v CM Portáli vlastného výberu performance countrov pre sledovanie SQL výkonu







Links

[1] https://customermonitor.eu/sites/default/files/SQL_Performance_Countre_Wizard01_select_templa tes.png

[2]

https://customermonitor.eu/sites/default/files/SQL_Performance_Countre_Wizard02_insert_data.png [3]

https://customermonitor.eu/sites/default/files/SQL_Performance_Countre_Wizard03_skip_action.png [4] https://customermonitor.eu/sites/default/files/SQL_performance_counters_podla_sablony_Memory

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[5] https://customermonitor.eu/sites/default/files/SQL_Performance_Countre_Wizard01_select_templa tes_0.png

[6] https://customermonitor.eu/sites/default/files/SQL_Performance_Countre02_Wizard02_insert_data .png

[7] https://customermonitor.eu/sites/default/files/SQL_Performance_Countre02_Wizard02_skipactions.png

[8] https://customermonitor.eu/sites/default/files/SQL_performance_counters_podla_sablony_Transact ions_Deadlocks_Ukazka.png

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