



# AppInsight for SQL – Deep SQL Server Monitoring

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## Bottlenecks in a SQL Environment

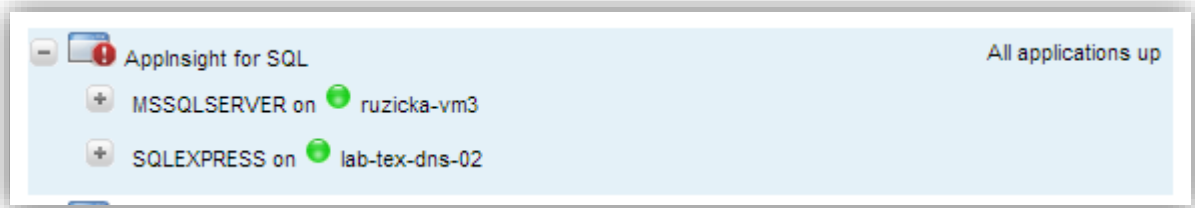
### Challenges faced by DBAs

Microsoft® SQL Server® is a popular database server used widely by Database Administrators (DBAs). Still it does not experience performance issues such as:

- **Queries:** A bad query from an application using the SQL database as well as expensive queries affects the performance of the whole database server.
- **Database Size:** As the database size grows and the size of each table increases, the server requires more memory and CPU to read the data so the process takes longer.
- **Indexing:** When you add more information to the database, the index content scatters and causes fragmentation. Poor index fragmentation requires more disk space usage and slows database searches.
- **Memory:** Insufficient memory reduces SQL server performance and leads to excessive paging.
- **Connections:** Database performance declines when an excessive number of users run queries or try to access the SQL server.

### Applnsight for SQL

Applnsight for SQL is a new feature that is now part of SolarWinds® [Server & Application Monitor](#) (SAM). SAM offers a detailed view of your SQL databases' performance without the use of agents by using the Applnsight for SQL embedded application.



*Applnsight for SQL gives you detailed insight about your SQL databases*

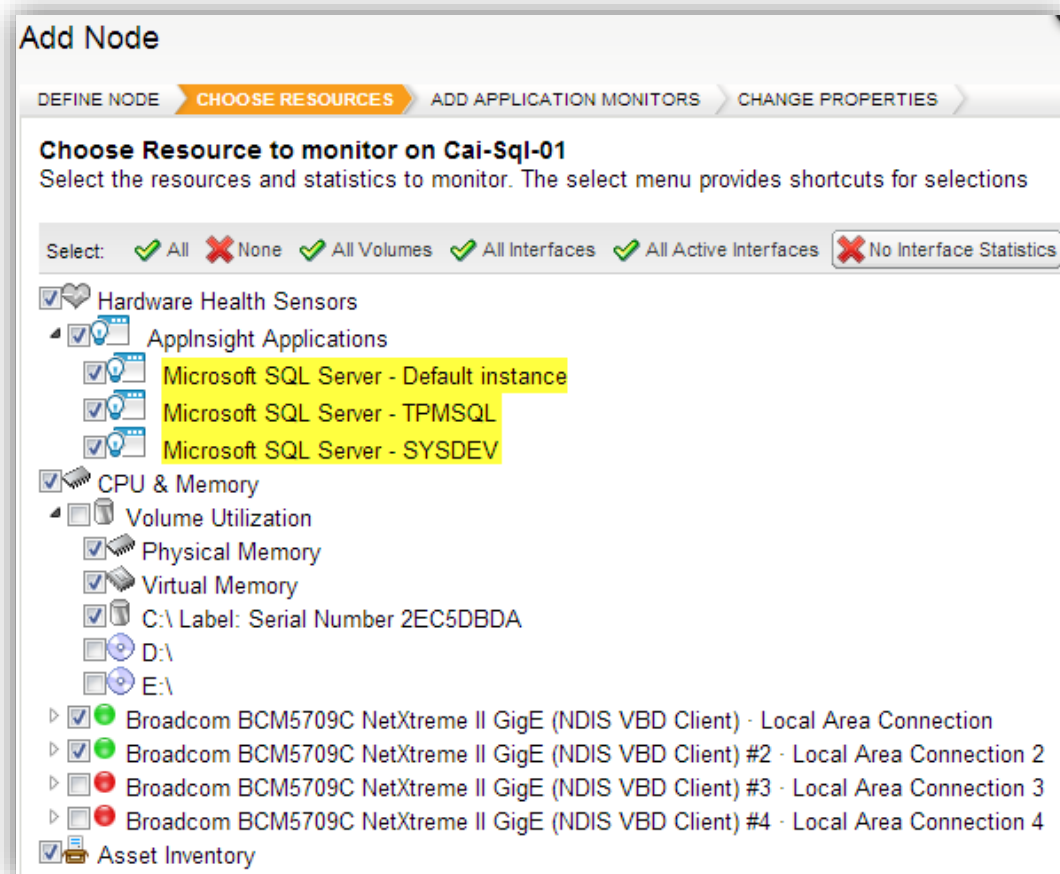
With Applnsight for SQL, DBAs can drill deeper into what's causing performance issues in SQL servers. Get visibility into the various components of a SQL instance or even the entire database itself. SAM offers comprehensive, simple, intuitive, and easy to use SQL monitoring. This helps system administrators and DBAs identify both common and complex database issues in the SQL environment.

Applnsight for SQL allows you to monitor virtually every aspect of your SQL instances and databases. Like any application that SAM monitors, Applnsight is also comprised of multiple performance counters that comprehensively monitors SQL servers.

## Setting up Applnsight

### Applnsight Discovery

When you are adding a node to SAM, it automatically discovers and lists all available SQL 2008, 2008R2, and SQL 2012 server instances found on the host. Use this list to select individual instances you want to monitor. You can also add SQL instances just as you would for the volumes or interfaces in SAM.



*Easily add multiple SQL instances to monitor in SAM*

You can also add Applnsight for SQL through SAM's Network Sonar Discovery Wizard. This allows you to easily scan an entire subnet, group of subnets, IP address ranges, or a list of individual IP addresses. You can quickly discover hosts on your network and any SQL server instance installed on those hosts. Regardless of the method you choose, monitoring a SQL instance in SAM is as easy as checking the box.

Once you enable Applnsight for monitoring SQL instances, it appears in the Applications tab along with other application you have running on that particular node.


## Network Sonar Results Wizard

DEVICES > INTERFACES > VOLUMES > **APPLICATIONS** > IMPORT PREVIEW > RESULTS > ADD APPLICATION MONITORS >

### Discovered Applications

Select the Applnsight Applications you want to use with your environment.

**Note:** You will be able to review, change and add applications that may not be listed here at a later step.

<input type="checkbox"/>	Count		
<input checked="" type="checkbox"/>	1		Microsoft SQL Server

BACK NEXT CANCEL

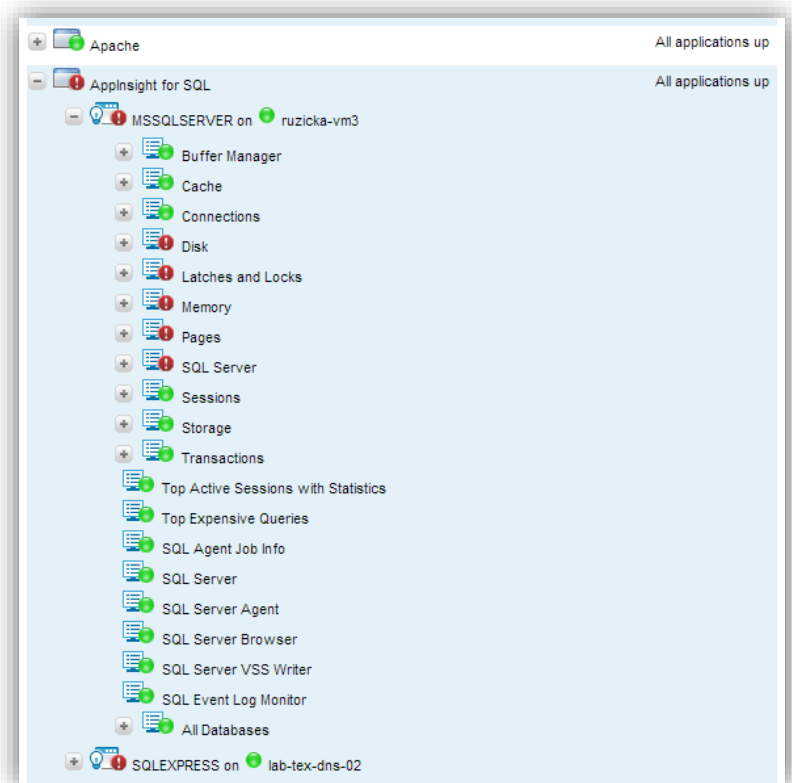
Select which SQL instance you want to monitor from the list

## Applnsight User Interface

### Intuitive Dashboard

Applnsight for SQL is listed under the All Applications section in SAM. The tree structure lets you see all the SQL instances that are currently being monitored. In addition, you can also see the node information along with each SQL instance. By hovering over the SQL instance or the node, you will get to know the availability and performance of that instance. SAM gives you the option to drill down from the dashboard to a specific component in case there is a performance issue.

*Look at critical SQL server components to quickly identify an issue*

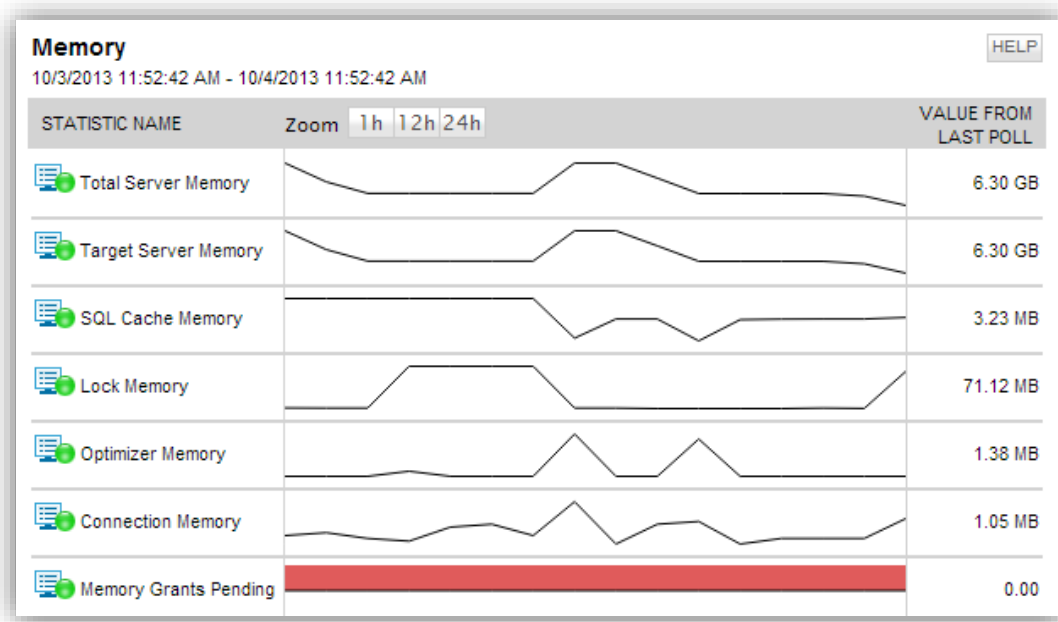


### Monitoring SQL Server Performance

Applnsight for SQL is a comprehensive [SQL server performance](#) monitoring feature in SAM. When you drill down from the All Applications page to the Application Details level, Applnsight for SQL shows you critical information like memory usage, disk usage, storage information, cache, buffer statistics, top expensive queries, SQL event logs, SQL error logs, and connections to the SQL server.

The Application Details page includes charts and graphs along with information about how each component is performing. You can compare current and historic component performance to see if there are changes or bottlenecks. For example, if you are troubleshooting a potential memory issue on your SQL server instance, then all information related to memory is contained under the memory resource. You can look at memory usage across databases for the last 24 hours or more to see if you need to make critical decisions.

Whether it is memory, disk usage, cache, or database size, ApplInsight for SQL has dedicated component monitors for each of those resources. This will help you identify the problem and troubleshoot easily.



Use ApplInsight for SQL to monitor various component details for each SQL instance

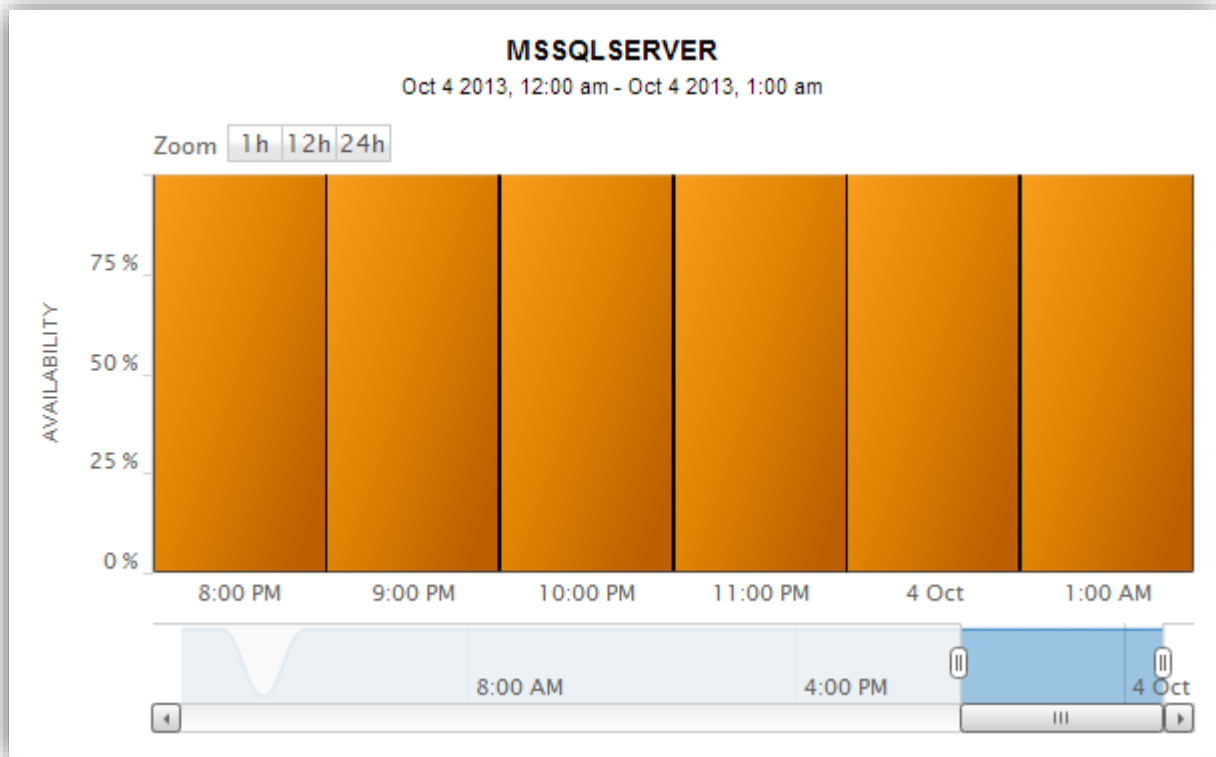
## Key Performance Metrics

ApplInsight for SQL offers a wealth of information to help you effectively monitor and manage your SQL servers. The following are a few examples to help you understand how ApplInsight comprehensively monitors your SQL instances.

### Database Availability

As a DBA, the most important information you need to know is whether your SQL servers are available. With ApplInsight for SQL, you can graphically see the various states of availability for the current database in a percentage format. This chart shows you the application availability and application status – if they are up, down, critical, or unavailable.

You can edit this resource to change availability interval, the chart title names, and the amount of historic data you want to load.



*Monitor the availability of every SQL server instance*

### Top Expensive Queries

ApplInsight for SQL allows you to monitor each query performance. For example, if a single query takes some time to respond, the CPU utilization level is high. This causes a strain on the other applications using the same SQL database. In order to optimize expensive queries, you can monitor the following key performance metrics using ApplInsight:

- **Execution:** This metric shows the number of times the listed query is executed.
- **CPU Time:** This shows what each query is doing to CPU load and performance. It also indicates how much time a listed query took to complete. You can gain insight into whether other applications are affected when CPU load is higher than usual.
- **Query Duration:** ApplInsight lets you monitor how long it takes for a query to run. This reveals the real issues occurring in the database server when a query is taking longer than usual to respond.
- **Logical and Physical Reads:** Logical reads indicate the total number of pages needed to process the query. The physical reads indicate the number of pages that are read from the disks.

You have the option to select queries based on time, host, database, and login details.

### Most Expensive Queries

Show Queries For: Time: All Host: All Database: All Login: All

QUERY	SPID	PLAN COUNT	EXECUTIONS	CPU TIME	PHYSICAL READS	LOGICAL READ	LOGICAL WRITES	AVERAGE DURATION	LOGIN	HOST	DATABASE
SELECT TOP 250 a.*, WebCommunityStrings [GUID] AS [GUID] FROM ( SELECT	1	1		570 ms	22	19120	0	588 ms			PRD2012
CREATE PROCEDURE [dbo].[apm_ComponentTemplatesGetByAppTemplate]	1	428		232 ms	1	2976	0	236 ms			Patches
CREATE PROCEDURE [dbo].[apm_ComponentTemplatesGetByAppTemplate]	1	428		232 ms	1	2976	0	236 ms			DERP
select tc.TABLE_SCHEMA, tc.TABLE_NAME, kcu.COLUMN_NAME from	7	4		162 ms	49	371	0	316 ms			master
(@EngineID int) SELECT n.NodeID, aip.PollingDescriptionName,	1	42		112 ms	0	115	0	198 ms			SolarWindsOrion
(@AppID bigint) SELECT ISNULL(cmpSett.[Key], tpDefSett.[Key]) AS [Key],	2	1128		99 ms	0	6613	0	103 ms			DERP
(@AppID bigint) SELECT ISNULL(cmpSett.[Key], tpDefSett.[Key]) AS [Key],	2	1128		99 ms	0	6613	0	103 ms			Patches
SELECT CONVERT(uniqueidentifier, HASHBYTES(MD2,rankTable[sql_handle])) as	1	1438		91 ms	13	13	0	93 ms			Patches

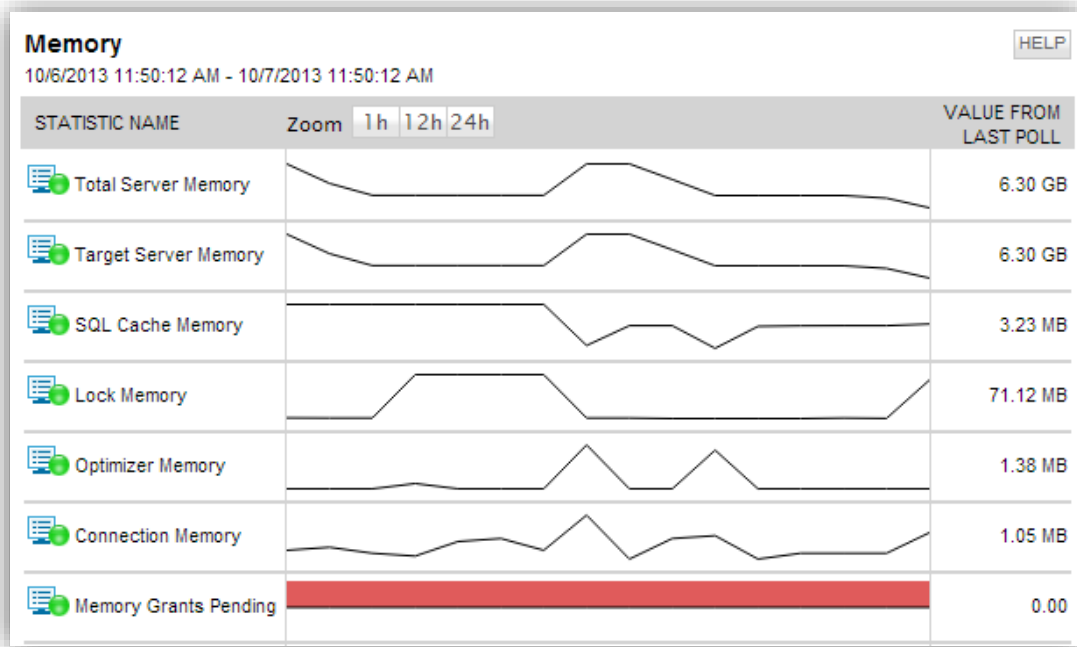
Easily identify expensive queries using built-in filters

### Troubleshoot Memory Issues

Another key performance counter to monitor in a SQL server is memory. Slowdowns within a SQL environment can lead to issues for multiple applications. Often, the root cause of slowdowns is due to memory bottlenecks. This occurs when you add more databases to your SQL server.

ApplInsight for SQL monitors your database servers for memory bottlenecks. You can monitor a variety of key metrics related to memory:

- Total Server Memory
- Target Server Memory
- SQL Cache Memory
- Lock Memory
- Optimizer Memory
- Connection Memory
- Memory Grants Pending
- Workfiles Created/sec
- Worktables Created/sec
- Cache Hit Ratio
- Pages/sec
- Available Mbytes
- Page Usage
- Granted Workspace Memory
- Memory Grants Outstanding
- Target – Total Server Memory



*ApplInsight enables you to identify and diagnose memory issues*

### **Other Key Performance Counters to Monitor**

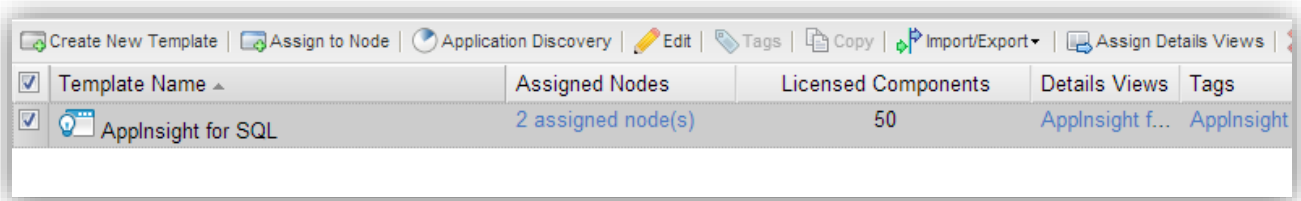
With ApplInsight for SQL, you can monitor a range of performance counters to find out the root cause of what is slowing your applications. While the metrics listed above are important, you should also watch the following counters for issues in your SQL environment.

- Database size
- Index fragmentation
- Hardware health
- CPU usage
- Database connections
- [SQL error logs](#)
- Buffer statistics
- Latches and locks
- Cache

## **How does ApplInsight Monitor SQL Servers?**

SAM uses a template based approach for monitoring servers and applications. Similarly, ApplInsight for SQL uses templates to monitor SQL servers. The ApplInsight template comes as a pack with 50 dedicated components which will solve common and complex problems in your SQL server. This is beneficial because DBAs can now monitor even the smallest issue which might have been difficult to achieve previously.



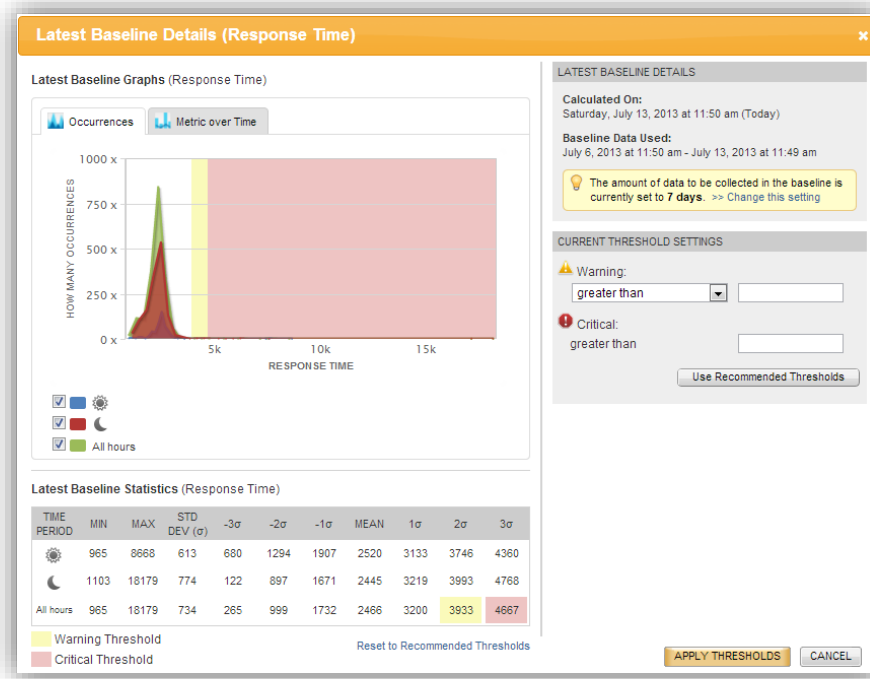


Add the Applnsight template to a node and start monitoring your SQL servers

## Statistical Thresholds and Real-Time Alerting

With Server & Application Monitor, you can leverage the built-in baseline thresholds to determine the level of alerts you receive from your SQL servers. Usually, you have to monitor your servers and applications for several weeks in order to know what the ideal baseline value is so you can set appropriate values for warning and critical thresholds. With SAM, you can calculate threshold values based on [statistical thresholds](#). SAM collects the data from the previous seven days and determines the baseline values automatically.

You can now select your work hours, nights, and weekends. Based on the time of the day, SAM calculates the baseline data for both day and night application performance. You have the option to manually set the threshold values for warning and critical stages in SAM.



Set automatic baseline thresholds to monitor your SQL database

## Real-time Reporting on SQL Databases

[SQL reporting](#) in AppInsight helps eliminate blind spots by providing in-depth visibility and reporting on the node, database memory, queries, disk usage, and more. You have access to over 100 out-of-the-box Web-based reports to help quickly uncover database issues, perform proactive performance analysis, and report on SLAs. Specific SQL monitoring reports include:

- Database back-up
- Database size by file
- Database status
- Most expensive queries
- Top clustered/non-clustered indexes by fragmentation
- Top tables by size
- Transaction log size by file

You can export all SAM reports and dashboard views to PDF for instant sharing with applications, lines of business, and development teams.

## Takeaway for DBAs & SysAdmins

With AppInsight for SQL, DBAs and System Administrators can now boldly go and troubleshoot issues in SQL server. Get access to a wealth of information about your SQL server performance which you thought was difficult to find. Use AppInsight and get these benefits:

- Get the most out of your SQL server – optimize SQL server performance by monitoring key metrics such as processor time, blocked queries, memory and storage utilization, and many more.
- Keeps you aware of the performance and availability of the database server at any given time.
- Increases the effectiveness of the database server.
- Avoid performance bottlenecks.
- The scalability to monitor more databases and instances.
- Helps you maintain your server hardware and keep it healthy.

## 5 Reasons to Download Applinsight for SQL

- Powerful and deep SQL server monitoring using agentless technology
- Easily solve common and complex SQL bottlenecks you face everyday
- Easy to setup and deploy, start comprehensive monitoring in less than an hour
- Uncover database issues with hundreds of out-of-the-box Web based reports
- Set automatic and meaningful baseline thresholds for getting instant alerts

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