Hewlett Packard Enterprise

HPE IMC APM

SQL Server Application Monitor Configuration Examples

Contents

Introduction

This document provides examples for configuring APM to monitor SQL Server database servers in a data center.

APM can monitor SQL Server 2000 SP4, SQL Server 2005, SQL Server 2008, and SQL Server 2012. This document uses SQL Server 2012 as an example.

Prerequisites

Before you configure APM to monitor SQL Server 2012, complete the following configurations:

- Configure and start SQL Server.
- To obtain traffic data for application monitor reports, install an IMC probe and add the probe to APM.
- To use the SQL Server authentication type, obtain the SQL Server user name and password and make sure the user has administrator privileges.
- To use the Windows authentication type, obtain the Windows user name and password and make sure the user has SQL Server administrator privileges.

Example: Using APM to monitor SQL Server

Network requirements

As shown in Figure 1, a company's data center uses a SQL Server database server to provide database services. The database server administrator intends to monitor SQL Server in APM.
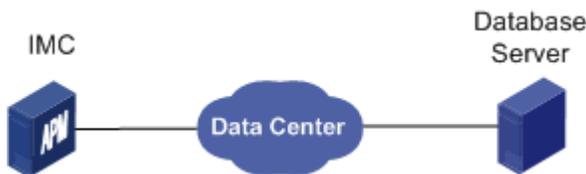
Figure 1 Network diagram

Table 1 Host addresses and software versions

Host	IP address	Software version
IMC	172.4.95.21	• Windows Server 2008 R2 • IMC PLAT 7.2 (E0403) • IMC APM 7.2 (E0401)
Database server	172.4.8.88	• Windows Server 2012 • SQL Server 2012

Adding a SQL Server application monitor

1. Log in to IMC.
2. Click the **Resource** tab.

3. From the navigation tree, select **Application Manager** > **Add Application**.
4. Click **SQL Server** of the **Database Server Monitor** category.
5. Configure the following monitoring parameters for the SQL Server application monitor on the host, as shown in Figure 2:
   o Enter **172.4.8.88** in the **IP Address** field.
     The **Name** field is automatically populated with **MSSQL_172.4.8.88**.
   o Select **SQL Server authentication** from the **Authentication Type** list.
   o Enter the user name and password in the **Username** and **Password** fields, respectively.
   o Use the default settings of other parameters.

   Figure 2 Adding an application monitor for SQL Server

6. Click **OK**.
   The application monitor named **MSSQL_172.4.8.88** appears on the application monitor list, as shown in Figure 3.

   Figure 3 Viewing the application monitor list

Configuring global thresholds for the SQL Server application monitor

1. Click the **Resource** tab.
2. From the navigation tree, select **Application Manager** > **Configurations**.
3. Click **Threshold Configuration**.

   The threshold configuration page appears.
4. Click the **Global Threshold** tab.
5. Click **Database Server Monitor** next to **Application Category**.
6. Click **SQL Server** next to **Application Type**.

   The list displays all SQL Server indexes for which you can configure thresholds, as shown in Figure 4.

   Figure 4 Global threshold list

   This example describes threshold settings of the **Average Wait Time** parameter.
7. Click the **Modify** icon for the **Average Wait Time** parameter.

   The **Modify Threshold** page appears.
8. Configure the following parameters, as shown in Figure 5:
   o Select **Enable** from the **Enable Level-1 Threshold** list.
   o Set a level-1 threshold value in the **Threshold** field.
   o Set an alarm trigger frequency in the **Trigger Times** field.
   o Select **Enable** from the **Enable Level-2 Threshold** list.
   o Set a level-2 threshold value in the **Threshold** field.
   o Set an alarm trigger frequency in the **Trigger Times** field.

   APM generates a level-1 or level-2 threshold alarm when the **Average Wait Time** meets the number of times specified by **Trigger Times** for the level-1 or level-2 threshold.

Figure 5 Modifying thresholds

9. Click **OK**.

Verifying the configuration

Viewing the SQL Server application monitor report

1. Click the **Resource** tab.
2. From the navigation tree, select **Application Management** > **Application Monitor**.

    The application monitor list displays all application monitors.
3. Click **MSSQL_172.4.8.88** to display the report.

    Figure 6 shows part of the SQL Server application monitor report. The report contains index values obtained from the most recent polling of the application.

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Figure 6 SQL Server application monitor report
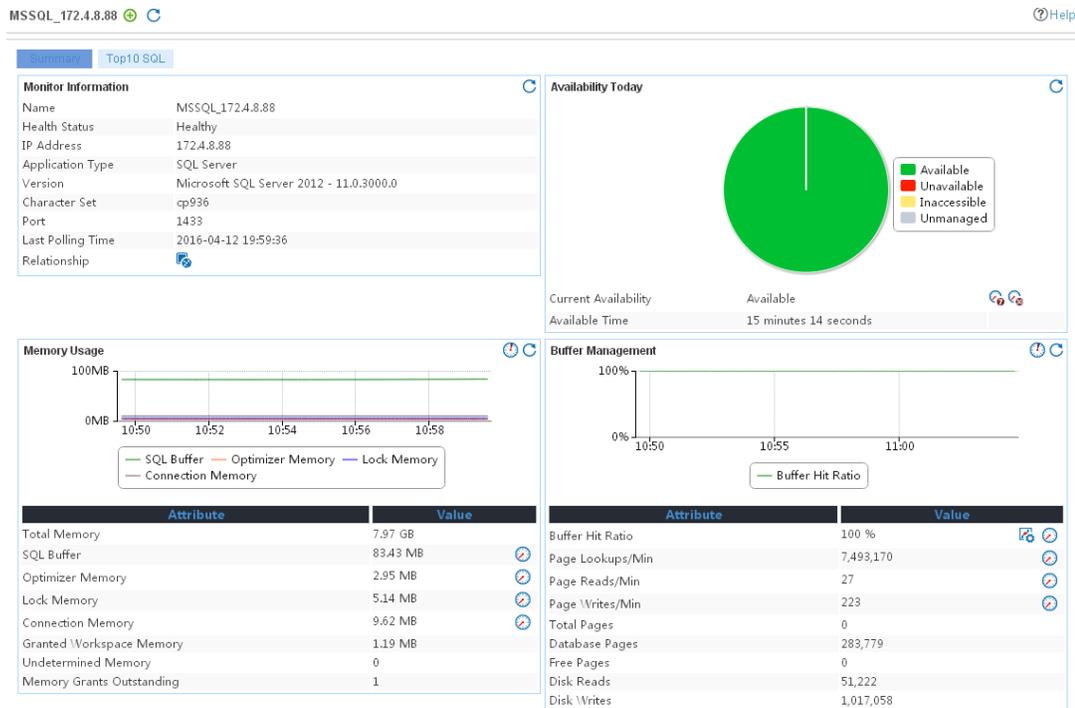
The following information describes some fields in the report.

Memory Usage

The **Memory Usage** area contains the following fields, as shown in Figure 7:

- **Total Memory**—Total size of the dynamic memory used by the SQL Server application.
- **SQL Buffer**—Size of the dynamic memory used by the SQL Server application for SQL cache. Click the **History Record** icon to view the history graph of the SQL buffer.
- **Optimizer Memory**—Size of the dynamic memory used by the SQL Server application to query optimization. Click the **History Record** icon to view the history graph of the optimizer memory.
- **Lock Memory**—Size of the dynamic memory used by the SQL Server application for locks. Click the **History Record** icon to view the history graph of the lock memory.
- **Connection Memory**—Size of the dynamic memory used by the SQL Server application to maintain connections. Click the **History Record** icon to view the history graph of the connection memory.
- **Granted Workspace Memory**—Size of the dynamic memory that the SQL Server application allocated for processes to perform operations, such as hashing, sorting, copying, and creating indexes.
- **Undetermined Memory**—Number of processes that were waiting for the permissions to use the workspace memory.
- **Memory Grants Outstanding**—Number of processes that were permitted to use the workspace memory.

Figure 7 Memory Usage area
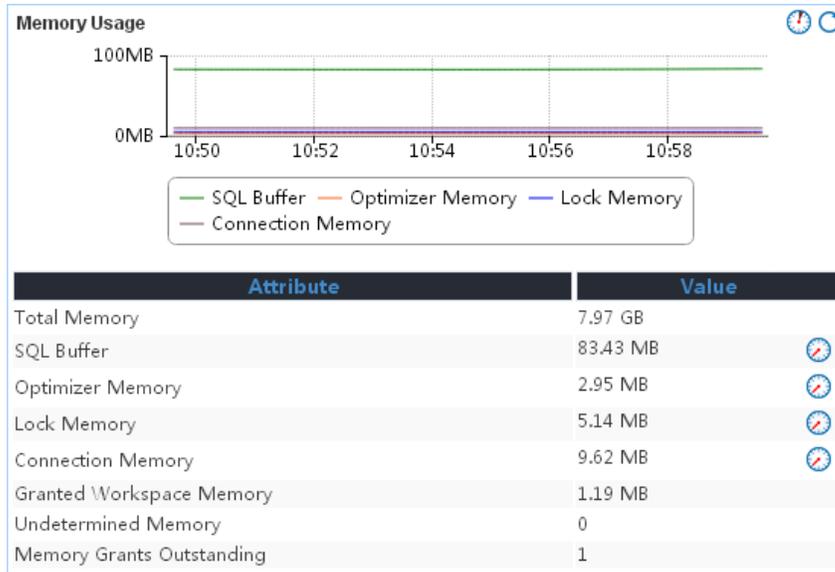
Connection Statistics

The **Connection Statistics** area contains the following fields, as shown in Figure 8:

- **Connection Time**—Time consumed when APM established the connection with the SQL Server application.
    - Click the **Set Threshold** icon to set alarm thresholds for the connection time.
    - Click the **History Record** icon to view the history graph of the connection time.
- **Active Connections**—Number of connections between the SQL Server application and its users. Click the **History Record** icon to view the history graph of active connections.
- **Logins/sec**—Number of newly established connections per second. Click the **History Record** icon to view the history graph of logins per second.
- **Logouts/sec**—Number of terminated connections per second. Click the **History Record** icon to view the history graph of logouts per second.

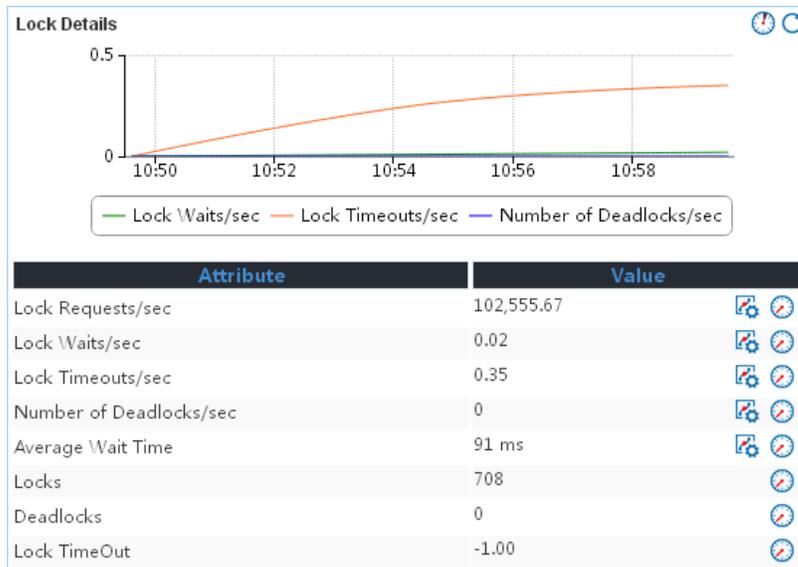**Figure 8 Connection Statistics area**
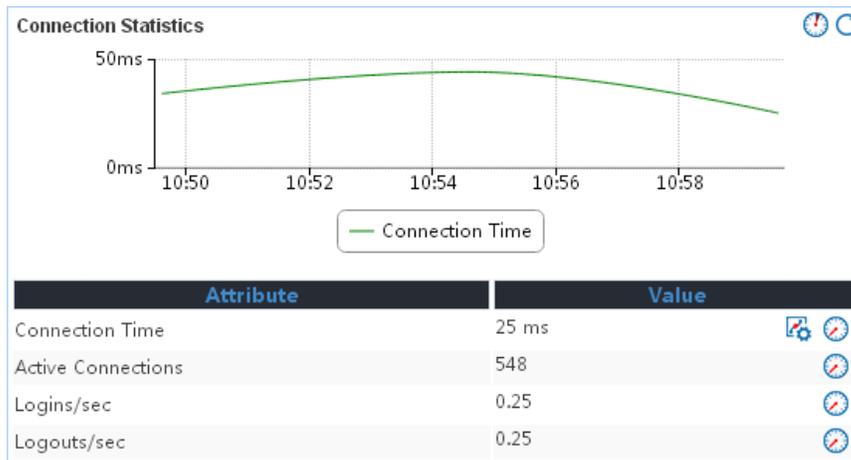
Lock Details

The **Lock Details** area contains the following fields, as shown in Figure 9:

- **Lock Requests/sec**—Number of lock requests and the lock conversions received by the SQL Server application per second.
  - Click the **Set Threshold** icon to set alarm thresholds for the lock requests per second.
  - Click the **History Record** icon to view the history graph of the lock requests per second.
- **Lock Waits/sec**—Number of waiting lock requests per second.
  - Click the **Set Threshold** icon to set alarm thresholds for the lock waits per second.
  - Click the **History Record** icon to view the history graph of the lock waits per second.
- **Lock Timeouts/sec**—Number of lock requests that timed out per second.
  - Click the **Set Threshold** icon to set alarm thresholds for the lock timeouts per second.
  - Click the **History Record** icon to view the history graph of the lock timeouts per second.
- **Number of Deadlocks/sec**—Number of lock requests that resulted in deadlocks per second.
  - Click the **Set Threshold** icon to set alarm thresholds for the number of deadlocks per second.
  - Click the **History Record** icon to view the history graph of the number of deadlocks per second.
- **Average Wait Time**—Average waiting time for each lock request.
  - Click the **Set Threshold** icon to set alarm thresholds for the average wait time.
  - Click the **History Record** icon to view the history graph of the average wait time.

Figure 9 Lock Details area

Attribute	Value	
Lock Requests/sec	102,555.67	
Lock Waits/sec	0.02	
Lock Timeouts/sec	0.35	
Number of Deadlocks/sec	0	
Average Wait Time	91 ms	
Locks	708	
Deadlocks	0	
Lock TimeOut	-1.00	

Latch Details

The **Latch Details** area contains the following fields, as shown in Figure 10:

- **Latch Waits/Min**—Number of waiting latch requests per second. Click the **History Record** icon to view the history graph of the latch waits per minute.

- **Average Latch Wait Time**—Average waiting time (in millisecond) for latch requests. Click the **History Record** icon to view the history graph of the average latch wait time.

Figure 10 Latch Details area
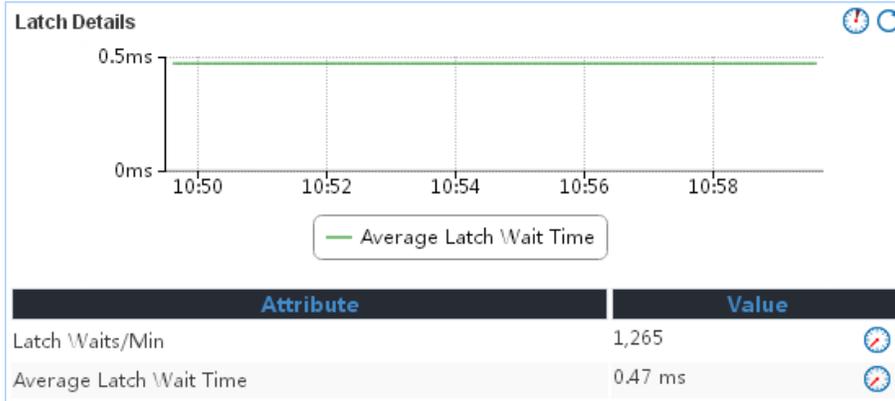
Database Details

The **Database Details** area contains the following fields, as shown in Figure 11:

- **Database**—Name of the running database in the SQL server application. "**_Total**" indicates statistics for all databases.
- **Size**—Disk space for the database.
- **Transactions**—Number of transactions that the database started per minute.
- **Active Transactions**—Number of active transactions of the database.
- **Log File**—Disk space for the database log files.
- **Log Files Used**—Size of used log files in the database.
- **Log Files Usage Ratio**—Usage ratio of the log files in the database. **Log Files Usage Ratio** = **Log Files Used/Log Files** x 100%. Click the **Set Threshold** icon to set alarm thresholds for the log file usage.
- **Log Writes**—Times of writing the log to the log file per minute.
- **Log Write Waits**—Number of logs that were waiting to be written to the log files.
- **Log Write Wait Time**—Calculated waiting time before the log was written to the log file.

Figure 11 Database Details area

Top 10 SQL By Execution Durations

The **Top 10 SQL By Execution Durations** contains the following fields, as shown in Figure 12:

- **SQL**—SQL statement whose execution duration reaches top 10 among all SQL statements.

- **Cumulative Execution Duration**—Total duration of SQL statement parse and execution.
- **Cumulative CPU Time**—Total CPU duration of SQL statement parse and execution.
- **Logical Reads**—Number of logical reads for the SQL statements.
- **Physical Reads**—Number of physical reads for the SQL statements.
- **Executions**—Number of executions for the SQL statement.

Figure 12 Top 10 SQL By Execution Durations area

SQL	Cumulative Execution Duration	Cumulative CPU Time	Logical Reads	Physical Reads	Executions
SELECT [historypro0_].[DBID_] [DBID1_5123_],[historypro0_].[DBVERSION_] [DBVERSION2_5123_],[historypro0_].[ID_] [ID3_5123_],[historypro0_].[PROCDEFID_] [PROCDEFID4_5123_],[historypro0_].[KEY_] [KEY5_5123_],[historypro0_].[START_] [START6_5123_],[historypro0_].[END_] [END7_5123_],[historypro0_].[DURATION_] [DURATION8_5123_],[historypro0_]. [STATE_] [STATE9_5123_],[historypro0_].[ENDACTIVITY_] [ENDACTI10_5123_],[historypro0_].[NEXTIDX_] [NEXTIDX11_5123_] FROM [JBPM4_HIST_PROCINST] [historypro0_] \WHERE [historypro0_].[ID_]=@1	1,312.14 s	1,308.64 s	50,940,356	437	25,764
select count(*) as col_0_0_ from tbl_fw_rule_control fwmrulecon0_ where fwmrulecon0_.endtime<=@P0	108.29 s	107.85 s	0	0	8,071,095
select processins0_.id as id5150_, processins0_.executionid as executio2_5150_, processins0_.state as state5150_, processins0_.isdraft as isdraft5150_, processins0_.componentid as componen5_5150_, processins0_.componentkey as componen6_5150_, processins0_.componentvalue as componen7_5150_, processins0_.description as descript8_5150_, processins0_.titleclassify_id as titlecla9_5150_, processins0_.dispexeuid as dispexeuid5150_, processins0_.service_id as service11_5150_, processins0_.incident_source as incident12_5150_ from tbl_jbpm_processinstance processins0_ where processins0_.componentid=@P0 and processins0_.componentkey=@P1 and processins0_.componentvalue=@P2	98.44 s	97.76 s	4,610,819	0	996
select count(*) as col_0_0_ from tbl_jbpm_processinstance processins0_ where processins0_.componentid=@P0 and processins0_.componentkey=@P1 and processins0_.componentvalue=@P2	97.84 s	97.09 s	4,610,819	0	996
select count(*) as col_0_0_ from tbl_jbpm_process_taskexecute taskexecut0_ where taskexecut0_.executionid=@P0	91.38 s	90.70 s	3,569,724	0	996
select taskexecut0_.id as id5151_, taskexecut0_.processid as processid5151_, taskexecut0_.taskid as taskid5151_, taskexecut0_.taskname as taskname5151_, taskexecut0_.executionid as executio5_5151_, taskexecut0_.executeaccount as executea6_5151_, taskexecut0_.issaved as issaved5151_ from tbl_jbpm_process_taskexecute taskexecut0_ where taskexecut0_.executionid=@P0	91.31 s	90.66 s	3,569,724	0	996
select count(*) as col_0_0_ from tbl_jbpm_process_taskexecute taskexecut0_ where taskexecut0_.taskid=@P0	48.83 s	48.60 s	3,569,724	0	996
select taskexecut0_.id as id5151_, taskexecut0_.processid as processid5151_, taskexecut0_.taskid as taskid5151_, taskexecut0_.taskname as taskname5151_, taskexecut0_.executionid as executio5_5151_, taskexecut0_.executeaccount as executea6_5151_, taskexecut0_.issaved as issaved5151_ from tbl_jbpm_process_taskexecute taskexecut0_ where taskexecut0_.taskid=@P0	48.82 s	48.64 s	3,569,724	0	996
select processins0_.id as id5150_, processins0_.executionid as executio2_5150_, processins0_.state as state5150_, processins0_.isdraft as isdraft5150_, processins0_.componentid as componen5_5150_, processins0_.componentkey as componen6_5150_, processins0_.componentvalue as componen7_5150_, processins0_.description as descript8_5150_, processins0_.titleclassify_id as titlecla9_5150_, processins0_.dispexeuid as dispexeuid5150_, processins0_.service_id as service11_5150_, processins0_.incident_source as incident12_5150_ from tbl_jbpm_processinstance processins0_ where processins0_.executionid=@P0	47.85 s	47.63 s	4,610,842	28	996
select count(*) as col_0_0_ from tbl_jbpm_processinstance processins0_ where processins0_.executionid=@P0	47.84 s	47.65 s	4,610,842	0	996

Viewing a threshold alarm

1. Open the SQL Server application monitor report.

   When a threshold alarm is generated, the health status of the SQL Server application monitor changes, and the **Monitor Information** area displays the unrecovered alarm, as shown in Figure 13.

Figure 13 Monitor information

2. Click the alarm information to view alarm details, as shown in Figure 14.

Figure 14 Alarm details