PUBLIC

SAP HANA hardware and cloud measurement tools 2.0

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How to Use the SAP HANA Hardware and Cloud Measurement Tools

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1 SAP HANA Hardware and Cloud Measurement Tools

This guide describes how to install and use the SAP HANA hardware and cloud measurement tools.

SAP HANA hardware and cloud measurement tools help customers and partners to optimize their hardware or cloud systems before deploying SAP HANA or applying for SAP HANA certification. The tools consist of the SAP HANA hardware and cloud measurement tool and the SAP HANA hardware and cloud measurement analysis, which is available online.

The SAP HANA hardware and cloud measurement tool allows customers and partners to collect information on the infrastructure intended for SAP HANA deployment. The tool measures whether the planned hardware or cloud system complies with the requirements defined by SAP. Furthermore, it gauges whether the system planned for SAP HANA deployment can achieve satisfactory base performance by meeting the minimum requirements defined as well as satisfactory overall performance given the intended SAP HANA usage. The measurement results are saved into a single file, which can be uploaded to the SAP HANA hardware and cloud measurement analysis for further analysis and reporting.

SAP HANA hardware and cloud measurement tools are based on the requirements of SAP HANA Platform 2.0 or newer. For older SAP HANA versions, refer to the SAP HANA Hardware Configuration Check Tool and the related *SAP Note 1943937*.

Related Information

Download and Install the SAP HANA Hardware and Cloud Measurement Tool [page 4]

SAP Note 2493172

SAP Note 1943937

1.1 What's New in SAP HANA Hardware and Cloud Measurement Tools

Learn about what's new and what's changed since the last release.

Title	Description	Version	Build Date
Comparing Multiple Measurements	You can now compare test results taken from multiple measurements to find regressions or opportunities for enhancement. For more information, see Comparing Multiple Measurements.	1.0.68	March 15, 2022

1.2 Download and Install the SAP HANA Hardware and Cloud Measurement Tool

Download and set up the SAP HANA hardware and cloud measurement tool to be able to measure whether the infrastructure planned for SAP HANA deployment meets the system and performance requirements that are needed for certification.

Prerequisites

- You have a valid S-user to download the tool.
- Make sure that the latest version of the SAPCAR archiving tool is available on the installation system. For more information about SAPCAR, see SAP Note 2452588.
- You have the latest version of SAP Note 2493172.

Procedure

1. Download the SAP HANA hardware and cloud measurement tool from the SAP Support Portal at https://launchpad.support.sap.com/#/softwarecenter > *INSTALLATION & UPGRADES* > *Access downloads* > *Search for: hana optim* > .

   The download package is displayed: HANA HW CLOUD OPTIM TOOLS 2.0.

   The following versions are available:
   - LINUX ON POWER LE 64BIT

    - LINUX ON X86_64 64BIT
2. Select the version according to your requirements.
3. Save the download archive in the same directory into which the tool should be installed.
4. Unpack the archive using SAPCAR.
5. Install the tool on the system you plan to analyze using `hcmtsetup`.

Results

After setup, the following folder structure is available:

Folder Structure

Folder Name	Content
`config`	Execution plans
`lib`	Dependent binaries
`hcmtplugins`	Test plug-ins

Related Information

System Configuration and Performance Measurement [page 5]

1.3 System Configuration and Performance Measurement

The measurement enables you to decide whether the system planned for SAP HANA deployment meets the desired system and performance requirements.

The SAP HANA hardware and cloud measurement tool performs a series of automated tests, for example network tests, file system consistency tests, system management BIOS tests, and CPU benchmark tests. The duration and repeat rate of the tests depends on the type of execution plan that you intend to run. The following execution plans are available:

- `executionplan.json` - Default execution plan that helps you to check if the KPIs for SAP HANA certification are met.
- `full_executionplan.json` - Performs the same tests as the default execution plan, but has a higher test repeat rate and thus a longer test duration. This test is required for SAP HANA certification.

The SAP HANA hardware and cloud measurement tool supports both Internet Protocol version 4 (IPv4) and version 6 (IPv6). However, all hosts must use the same IP version. A combination of different IP versions is not supported.

Related Information

Measure System Configuration and Performance - Scale-out Systems [page 6]
Measure System Configuration and Performance - Scale-up Systems [page 8]

1.3.1 Measure System Configuration and Performance - Scale-out Systems

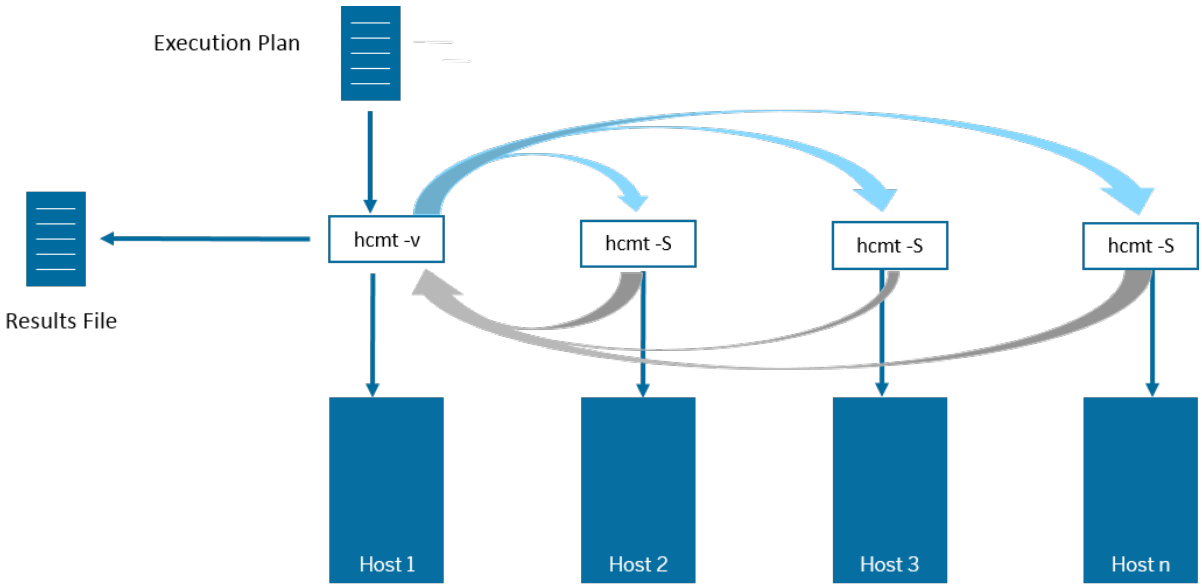
Perform a measurement to see whether the scale-out system planned for SAP HANA deployment meets the system and performance requirements that are needed for SAP HANA certification.

Prerequisites

- You have installed the latest version of the SAP HANA hardware and cloud measurement tool on the system.
- You have at least 20 GB of free storage space in the location where SAP HANA data can be placed during the test.
- If SAP HANA is already installed, the database must be stopped for the duration of the measurement.
- When using nonvolatile memory, mounts for all hosts or an alias of the same name must be available.
- Ports 50000 and 50001 must be open for communication.

Context

The measurement tool performs a series of automated tests based on the execution plan that you select, for example `executionplan.json` or `full_executionplan.json`. For scale-out systems, you start the measurement tool on the master host and specify any worker hosts on which the tests should run as well. The tool reads the execution plan, starts the test locally, and delegates tests marked for scale-out to the worker hosts. The tool waits for the completion of the tests on the worker hosts before starting the next test in the execution plan. All test measurement data and the host manifests are collected in one result file written by the master host instance.



Starting the Measurement Tool on a Scale-out System

Procedure

1. To start the measurement tool on the worker hosts in verbose mode, enter **`hcmt -v -S`** on each of the hosts.
2. To start the measurement tool on the master host in verbose mode, enter **`hcmt -v`**.
3. Adjust the following variables that are contained in the execution plans:

Variable	User Entry
`<LogVolume>`	Specify the location where logs should be written.
`<DataVolume>`	Specify an existing location where SAP HANA data can be placed.
`<NvmBasePath>`	If persistent memory is available, specify the mount paths of this persistent memory separated by commas. If no persistent memory is available, leave empty.
`<Hosts>`	Specify, in no particular order and separated by commas, the remote hosts that you want to measure. You do not have to enter host 1, because it is included automatically in the measurement. **i Note** Measuring the system configuration and performance using the default execution plan or the full execution plan may take some time. To check whether the cor-

Variable	User Entry
	rect host names are used, we recommend performing a quick check using **`quickcheck.json`**.

4. Enter **`hcmt -v -p <planfile>`**, using the fully qualified path of the installation directory, for example **`.../installation/config/executionplan.json`**.

   This starts a measurement using the selected execution plan. The results of the measurement are saved in the `hcmtresult-[timestamp].zip` file. You can upload the results to the SAP HANA hardware and cloud measurement analysis for a more detailed analysis. For more information, see *Analyzing Measurement Results*.
5. End all **`hcmt`** processes after finishing the measurement. This helps to ensure that the ports are closed for communication. In particular, remember to close all remote instances, as these may be vulnerable to threats.

Related Information

Analyzing the Measurement Results [page 14]
Command Line Parameters [page 10]
Measure System Configuration and Performance - Scale-up Systems [page 8]

1.3.2 Measure System Configuration and Performance - Scale-up Systems

Perform a measurement to see whether the system planned for SAP HANA deployment meets the desired system and performance requirements.

Prerequisites

- You have installed the latest version of the SAP HANA hardware and cloud measurement tool on the system.
- You have at least 20 GB of free storage space in the location where SAP HANA data can be placed during the test.
- If SAP HANA is already installed, the database must be stopped for the duration of the measurement.
- When using nonvolatile memory, mounts for all hosts or an alias of the same name must be available.
- Port 50001 must be open for communication.

Context

The measurement tool performs a series of automated tests based on the execution plan that you select, for example (`executionplan.json` or `full_executionplan.json`).

Procedure

1. To start the measurement tool in verbose mode, enter **`hcmt -v`**.
2. Adjust the following variables that are contained in the execution plans:

Variable	User Entry
`<LogVolume>`	Specify the location where logs should be written.
`<DataVolume>`	Specify an existing location where SAP HANA data can be placed.
`<NvmBasePath>`	If persistent memory is available, specify the mount paths of this persistent memory separated by commas. If no persistent memory is available, leave empty.
`<Hosts>` **i Note** **This variable is only relevant for scale-out systems.**	Leave empty.

3. Enter **`hcmt -v -p <planfile>`**, using the fully qualified path of the installation directory, for example **`.../installation/config/executionplan.json`**.

   This starts a measurement using the selected execution plan. The results of the measurement are saved in the `hcmtresult-[timestamp].zip` file. You can upload the results to the SAP HANA hardware and cloud measurement analysis for a more detailed analysis. For more information, see *Analyzing Measurement Results*.

Related Information

Analyzing the Measurement Results [page 14]
Command Line Parameters [page 10]
Measure System Configuration and Performance - Scale-out Systems [page 6]

1.3.3 Command Line Parameters

You can use a variety of command line parameters when working with the SAP HANA hardware and cloud measurement tool.

Command Line Parameters

Parameter	Description
-a	Allows you to specify variables, for example <LogVolume> or <DataVolume>, without having to wait for prompts by the tool. Sample syntax: **hcmt -v -a "DataVolume=/hana/data,LogVolume=/hana/log,Hosts=hostname1\,hostname2"**
-c	Sends a command to a running server instance.
-e <testguid>	Executes the test using default parameters. The result is shown in verbose mode in the shell.
-h	Displays help.
-K	Private key that is used for remote access.
-l	Lists all available tests.
-o	Specify an output file name for the measurement.
-p <planfile>	Executes a nondefault plan. Use a fully qualified path to specify a plan.
-P <port>	Specify the port used for communication.
-q	Suppresses progress indicator on the console.
-R <name>	Executes the specified plan on the specified remote server.
-S	Starts a remote server.
-t	Traces into `hcmttrc.log`.
-v	Displays verbose output. → Tip We recommend using verbose mode to receive status feedback on the execution of the measurement test.

1.3.4 Modifying Execution Plans

You can modify an execution plan to accommodate certain test scenarios, for example, to shorten the test duration or test for individual performance indicators.

Shorten Test Duration by Adjusting Test Repeat Count

The default test repeat count is 5, that is, the tool performs each test five times. To reduce the number of repetitions, you can enter a lower `RepeatCount` value. The value must be ≥ 1, however.

Example: Reducing `RepeatCount` value

```
{...
 "ExecutionPlan": [
 {
 ...
 "ExecutionVariants": [
 {
    "ScaleOut": {
       "Port": "${RemotePort}",
       "Hosts": "${Hosts}",
       "ConcurrentExecution": true
    },
    "RepeatCount": "2",
    "Description": "CPU Performance",
    "InputVector": {
         "NumberArithmetricOperations": "2000000",
      "PrimeNumbersSearchTime": 10
   }
 }
 ]
 }
 ]
...}
```

Testing for Individual Performance Indicators

Each execution plan is an array of tests. Each test is represented by a unique identifier and a number of attributes. To test only a particular set of performance indicators, copy the *.json file and remove those parts of the execution plan that you don't want to test. To do so, search for a test GUID and remove the code block in between the corresponding braces {}. The example below shows the parts to be removed in bold type. Ensure that the file contains valid JSON.

```
                   "PrimeNumbersSearchTime": 10
               }
            }
         ]
      },
```

```
      {
         "ID": "3CF9A97D-E1F6-4341-BC316AA2413697FF",
         "Note": "NUMA Timer Test",
         "ExecutionVariants": [
            {
               "ScaleOut": {
                  "Port": "${RemotePort}",
                  "Hosts": "${Hosts}",
                  "ConcurrentExecution": true
               },

               "RepeatCount": "${TestRepeatCount}",
               "Description": "Timer Checks",
               "InputVector": {
                  "TestTime": 2000
               }
            }
         ]
      },
      {
         "ID": "36324424-F9CC-44DF-820752124C6A5652",
         "Note": "NUMA Memory Latency Test",
         "ExecutionVariants": [
```

1.4 Working with the Measurement Results

Upload the measurement results file and analyze the results to see whether your systems meet the configuration and performance requirements.

You use the SAP hardware and cloud measurement analysis to upload the measurement results file and analyze the setup and performance of the systems that are intended for SAP HANA deployment. The analysis service is available at https://hotui-supportportal.dispatcher.hana.ondemand.com/index.html.

As a first step, you must enter the systems that have been measured. After that you can upload, display, and analyze the results in detail. Furthermore, you can share measurements for individual systems with other users.

Related Information

Adding Systems to the SAP HANA Hardware and Cloud Measurement Analysis [page 13]
Uploading Measurement Results [page 14]
Analyzing the Measurement Results [page 14]
Sharing Systems [page 18]

1.4.1 Adding Systems to the SAP HANA Hardware and Cloud Measurement Analysis

Add the systems that were measured to be able to upload and drill down into measurement results.

Context

You enter system details, for example, the system name, deployment model, and anticipated number of users. This allows you to upload different sets of measurement results for each system and view the measurement parameters and results.

Procedure

1. Choose *Manage Systems* on the SAP HANA hardware and cloud measurement analysis start page.
2. On the *System/Measurement* pane, choose *Add System*.
3. Enter system details, for example, the system name, deployment option, memory size, and the anticipated number of users.
4. Save your entries.

Related Information

Uploading Measurement Results [page 14]

1.4.2 Deleting Systems from the SAP HANA Hardware and Cloud Measurement Analysis

If you no longer wish to display the measurement results for a system, you can delete the system from the SAP HANA hardware and cloud measurement analysis.

Procedure

1. Choose *Manage Systems* on the SAP HANA hardware and cloud measurement analysis start page.
2. In the *Systems/Measurements* column, select the system that you want to delete.
3. Choose *Delete Selected Item*.

Results

The system is deleted from the SAP HANA hardware and cloud measurement analysis.

1.4.3 Uploading Measurement Results

Upload the measurement results file and display the results to see whether your systems meet the configuration and performance requirements.

Prerequisites

You have selected a system in the SAP HANA hardware and cloud measurement analysis.

Procedure

1. Choose ↥ *Upload Archive*.
2. Specify a name for the measurement and the system that has been measured.
3. Choose *Browse...* and select a results file.
4. Review your entries and submit the file.

Results

You uploaded the results file for the corresponding system and can now display and further analyze the measurement results.

1.4.4 Analyzing the Measurement Results

Display the results of the system measurement and drill down into test and measurement details.

Prerequisites

You have uploaded at least one measurement results file to the SAP HANA hardware and cloud measurement analysis.

Context

SAP HANA hardware and cloud measurement analysis provides a graphical and textual representation of your measurement results. It allows you to see which parts of your system are doing well and which parts may need some changes or improvements to achieve the required performance.

Displaying Measurement Results

The information on the *Systems/Measurements* pane is displayed as indicated in the table.

To display more detailed information regarding systems, measurements, individual tests, parameter sets, or single measurements in the *Selection Details* pane, select one of the items mentioned. To display the information for more than one item, choose *Toggle multi-select mode* and select the items you would like to display. Alternatively, choose `Ctrl` and select the desired items.

Measurement Results Display

Selection	The *Systems/Measurements* pane displays the following:	The *Selection Details* pane displays the following:
Scale-up system Scale-out system	Name and type of the system that you specified.	Additional data regarding the system, for example, the overall analysis result in percent, number of users, creation time, or the number of measurements.
Measurement	Name of the measurement that you specified when uploading the results file.	Additional data regarding the measurement, for example, memory, tool set, or machine topology.
Individual Test	Name of the tests that have been carried out, for example, *FileSystem Read* or *FileSystem Consistency*.	Overall result of the test and additional information, which may assist you in optimizing your system.
Single Measurements	Individual measurements for a given parameter set, for example, *AsynchronousSubmitTime*, *Latency*, or *LatencyNumOps*.	The results of the individual measurements displayed as a graph or text. Most test results are displayed graphically, that is, in a bar or graph chart. When you hover the mouse over the bar, you see the detailed results, for example, the name of the measurement, KPI value, and measurement value. In addition, you can change the chart type, print the chart, display the results in a table, or download the measurements to a spreadsheet.

The tool performs a number of measurements, some of which are related to parameters that ensure your system can achieve high performance. Others are target KPIs that must be met to pass certification. These KPIs are labeled as such and the required target values are displayed in the charts.

Measurement Results

Measurement Result	Description
100%, green bar	All tests fulfill the requirements defined by SAP.
<100%, red bar	Percentage of the number of tests that meet the thresholds or KPIs defined. All tests contained in the execution plan have been performed.
<100%, pink bar	Percentage of the number of tests that meet the thresholds or KPIs defined. One or more tests that contain KPIs have been deactivated in the execution plan.
No bar	The analysis does not entail KPIs that are relevant for certification, but other performance indicators.

Comparing Measurement Results

You can compare the measurement results as follows by making the corresponding selections on the *Systems/Measurements* pane:

- Compare the same measurement(s) for different systems.
- Compare the same parameter set for different systems.
- Compare different measurements for one system.

  > **i** Note
  >
  > Different single measurements can only be displayed in one chart, if they have the same unit of measurement.

- Compare different measurements for different systems.

  > **i** Note
  >
  > Different single measurements can only be displayed in one chart, if they have the same unit of measurement.

1.4.5 Comparing Multiple Measurements

Compare test results taken from multiple measurements to find regressions or opportunities for enhancement.

Prerequisites

You have uploaded at least two measurement result files to the SAP HANA hardware and cloud measurement analysis.

Context

With SAP HANA hardware and cloud measurement analysis you can compare multiple measurements in one clear chart. This is useful to find regressions quickly, or to get a quick overview which effect a hardware change

had compared to an older measurement. Note that the comparison is currently only possible for numerical results.

Procedure

1. On the *Systems/Measurements* pane select at least two measurement nodes at the same time, either by holding `Ctrl`/`Cmd` while selecting the nodes, or by using the *Toggle Multi-Select Mode* button above the tree table.
2. In the *Selection Details* pane, choose *Compare Selected Measurements*. You can now choose which test you would like to compare and which type of comparison you would like to do.
3. Choose *Show Comparison*.

Results

You can now see a chart comparing the test results of the selected measurements in one chart. The following comparisons are available:

Line Chart

The single measurement results are contrasted directly by their value, with lines connecting the points belonging to the same measurement. You can deactivate the lines using the button above the chart.

As each measurement consists of multiple values (typically 5), you can choose how these are aggregated: they are either averaged or the minimum/maximum can be displayed. You may choose to only show parameter sets with a KPI attached, if such a parameter set exists in the chosen test. In this case, a line indicating the KPIs is also added to the chart.

> **i** Note
>
> The chart does not indicate whether KPIs are met or not, the KPI indicator line is for your information only. Refer to the analysis detail views to see whether a measurement meets the given KPIs.

Baseline

The results from one measurement are selected as a baseline and the results from all other selected measurements are displayed as a difference from this baseline. Points belonging to the same measurement are connected by lines. You can deactivate the lines using the button above the chart.

As each measurement consists of multiple values (typically 5), you can choose how these are aggregated: they are either averaged or the minimum/maximum can be displayed. You may further select whether the difference from the baseline should be displayed in absolute values or percentage points.

1.4.6 Grouping Systems

Use folders to group the systems that you plan to measure and analyze.

Context

You can group systems according to your own criteria, for example, the types of systems (development, QA, or production systems) or lines of business.

Procedure

1. Choose *Manage Systems* on the SAP HANA hardware and cloud measurement analysis start page.
2. On the *System/Measurement* pane, choose *Add Folder*.
3. Enter a name for the folder.
4. Save your entry.

Results

You created a folder for grouping and can now move existing systems to this folder or add new ones.

1.4.7 Sharing Systems

You can share systems to enable other users in your company to view or upload measurements.

Prerequisites

Users must be assigned to the *Manage Shared Hardware & Cloud Measurements (MEAS_HWCLD)* authorization object in the *Support User Management Application* in the SAP ONE Support Launchpad available at https://launchpad.support.sap.com/#/user/management to be able to view systems that have been shared by other users in their company. To access the application, you need a valid S-user and the respective S-user authorization. For more information, see the *Related Information* section.

Context

Deploying SAP HANA often is a team effort. Therefore, it's important to be able to share systems with other users so that they can view and analyze existing measurements and upload new measurements.

Procedure

1. On the *Systems/Measurements* pane, select the system that you want other users in your company to be able to view or upload measurements to.
2. Choose *Share* and enter the users that you want to share with as well as the type of permission to grant.

Results

The next time the users log on to the SAP HANA hardware and cloud measurement analysis, they'll be able to view and analyze the system.

Related Information

User Management
Authorization Concept

Important Disclaimers and Legal Information

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