OMi Management Pack for SAP HANA

Software Version: 2.00

HP Operations Manager i for Linux and Windows® operating systems

User Guide

Document Release Date: September 2017
Software Release Date: September 2017

Hewlett Packard Enterprise

Legal Notices

Warranty

The only warranties for Hewlett Packard Enterprise products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. Hewlett Packard Enterprise shall not be liable for technical or editorial errors or omissions contained herein.

The information contained herein is subject to change without notice.

Restricted Rights Legend

Confidential computer software. Valid license from Hewlett Packard Enterprise required for possession, use or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer Software, Computer Software Documentation, and Technical Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

Copyright Notice

Trademark Notices

Adobe® is a trademark of Adobe Systems Incorporated.

Microsoft® and Windows® are U.S. registered trademarks of Microsoft group of companies.

UNIX® is a registered trademark of The Open Group.

Documentation Updates

To check for recent updates or to verify that you are using the most recent edition of a document, go to: https://softwaresupport.hpe.com/.

This site requires that you register for an HPE Passport and to sign in. To register for an HPE Passport ID, click **Register** on the HPE Software Support site or click **Create an Account** on the HPE Passport login page.

You will also receive updated or new editions if you subscribe to the appropriate product support service. Contact your HPE sales representative for details.

Support

Visit the HPE Software Support site at: https://softwaresupport.hpe.com/.

Most of the support areas require that you register as an HPE Passport user and to sign in. Many also require a support contract. To register for an HPE Passport ID, click **Register** on the HPE Support site or click **Create an Account** on the HPE Passport login page.

To find more information about access levels, go to: https://softwaresupport.hpe.com/web/softwaresupport/access-levels.

HPE Software Solutions Now accesses the Solution and Integration Portal website. This site enables you to explore HPE product solutions to meet your business needs, includes a full list of integrations between HPE products, as well as a listing of ITIL processes. The URL for this website is https://softwaresupport.hpe.com/km/KM01702731.

Contents

Chapter 1: OMi Management Pack for SAP HANA

The OMi Management Pack for SAP HANA (OMi MP for SAP HANA) works with Operations Manager i (OMi) and enables you to monitor SAP HANA database environments. It also provides out-of-the-box Management Templates for monitoring different types of SAP HANA environments - scale up and scale out. These Management Templates consist of a wide range of Aspects which enable the monitoring of SAP HANA database components.

These Management Templates can be seamlessly deployed by administrators for monitoring SAP HANA databases in an environment. The Subject Matter Experts (SMEs) and developers can easily customize the SAP HANA Management Templates.

The OMi MP for SAP HANA also includes the performance dashboard. The performance dashboard provides Out-of-the-box graphs to track and analyze the performance trend of the HANA metrics.

OMi MP for SAP HANA has the capability to monitor SAP HANA High Availability Systems. For more information, see "Monitoring for SAP HANA High Availability" on page 55.

OMi MP for SAP HANA supports the following:

- Automated instance based deployment and simplified configuration.
- Provides monitoring of the health and performance of SAP HANA database and its underlying infrastructure based on the deployment scenarios.
- Ready to deploy out-of- the-box management solutions to suit different monitoring requirements.

The HANA nodes can have different deployment scenarios. For more information, see "Deployment Scenario" on page 9.

New Features in Release

The OMi MP for SAP HANA works with Operations Manager i (OMi) and enables you to monitor SAP HANA database.

Release 2.00

OMi MP for SAP HANA release 2.00 contains the following features:

- Supports until SAP HANA 1.0 including SPS12 & SAP HANA 2.0 (SPS01).
- Discovery & Monitoring of SAP HANA Multitenant Database Containers (MDC).
- Supports monitoring of SAP HANA High Availability systems.
- Enhanced monitoring of Workload Statistics.
- Includes Out-of-the-box Performance Dashboard to track and analyze the performance trend of the HANA metrics.

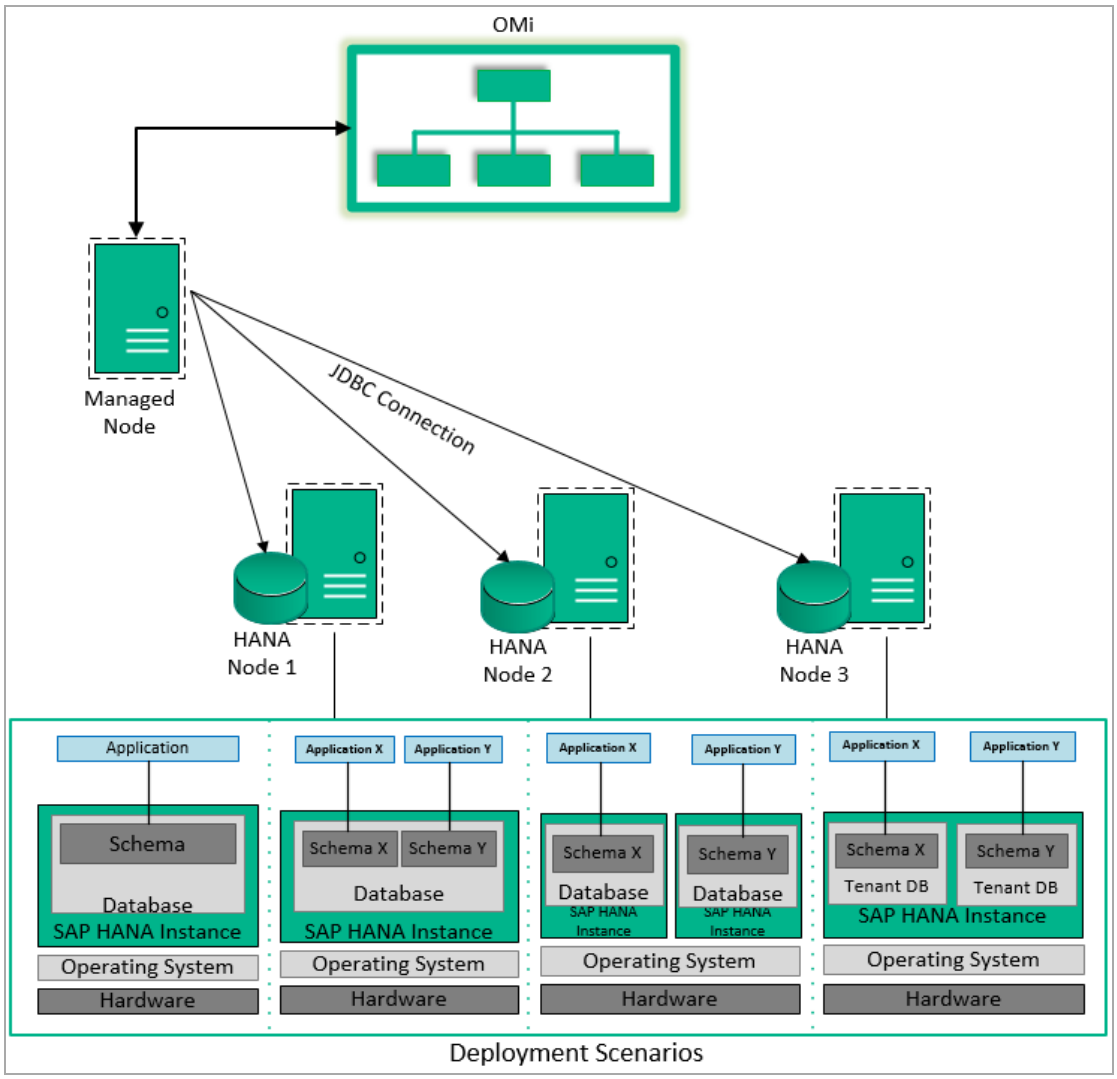
Release 1.00

OMi MP for SAP HANA release 1.00 contains the following features:

- HANA Management Templates for the complete management of SAP HANA databases. It consists of HANA Aspects for monitoring the availability, health, and performance of SAP HANA databases.
- HANA Aspects comprising of policy templates for monitoring the SAP HANA databases.
- Parameterized artifacts for easy customization and deployment.
- The Indicators - Health Indicators (HIs) to analyze and categorize the events occurring in the databases and report the health status.
- Automated instance based deployment and configuration.

Deployment Scenario

OMi MP for SAP HANA is installed on OMi. A node must be installed with Operations Agent and should be configured as a managed node with capabilities to connect to the SAP HANA nodes using remote JDBC connectivity. The SAP HANA JDBC jar or SAP HANA client needs to be available on the managed node.



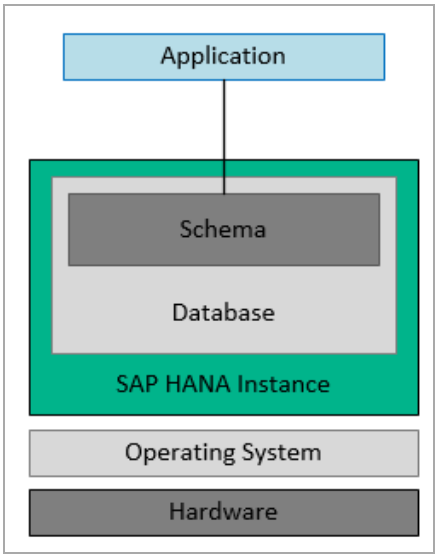
The OMi MP for SAP HANA comprises of SAP HANA aspects and management templates for monitoring the availability, health, and performance of SAP HANA databases. When you specify the values for the parameters in the aspects and deploy to the remote node, OMi MP for SAP HANA discovers information about the SAP HANA databases and services on the SAP HANA nodes.

The following are the deployment scenarios for SAP HANA nodes:

- Standard Deployment
- Multiple Components in One Database (MCOD)
- Multiple Components in One System (MCOS)
- Multitenant Database Containers (MDC)

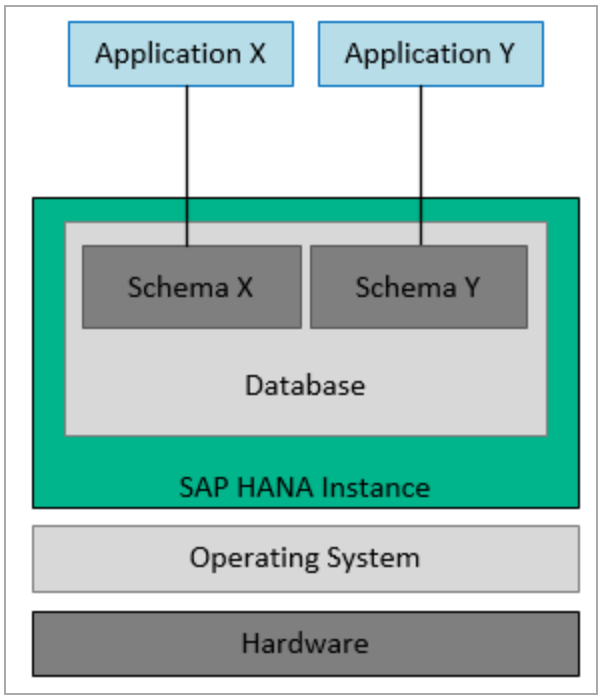
Standard Deployment Scenario

In this scenario, there is only one SAP HANA instance with one database, schema, and application.



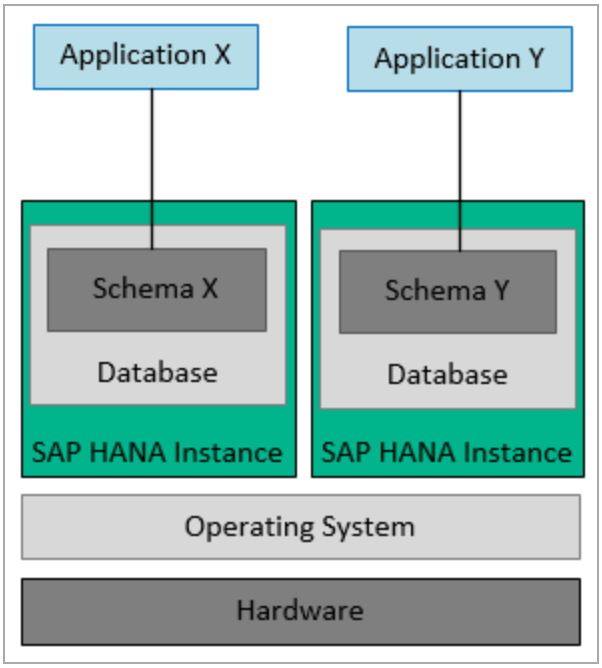
Multiple Components in One Database (MCOD) Deployment Scenario

In this scenario, there is only one SAP HANA instance with one database. The database can have multiple schemas with respective application.



Multiple Components in One System (MCOS) Deployment Scenario

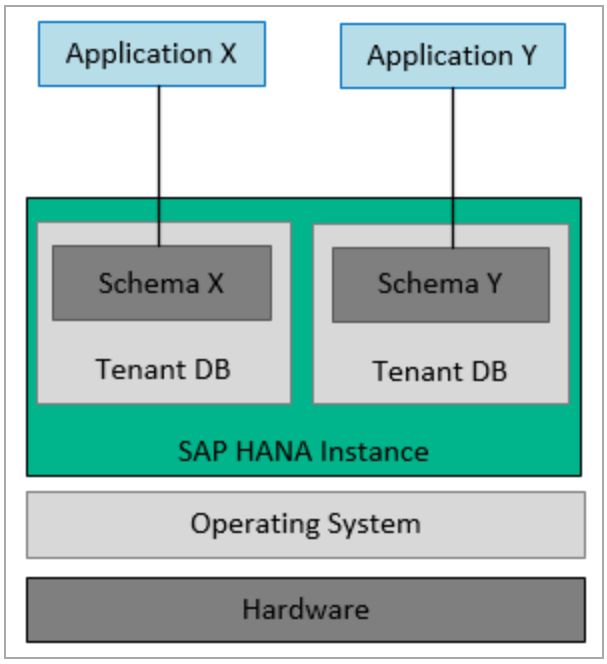
In this deployment, the SAP HANA nodes can have multiple SAP HANA instances with respective database, schema and application.



Multitenant Database Containers (MDC) Deployment Scenario

In this scenario, you can run multiple tenant databases on one SAP HANA instance. This deployment has strong seperation of data and users with application specific life cycle management.

> **Note:** Ensure the following:
>
> - The roles should be added to be both the System DB and all the tenants DB.
> - In this deployment scenario, the OMi MP for SAP HANA user must be assigned the `MONITORING` roles of the standard SAP HANA database.


Application X
Application Y
Schema X
Tenant DB
Schema Y
Tenant DB
SAP HANA Instance
Operating System
Hardware

Chapter 2: Getting Started

The following section provides step-by-step instructions for monitoring SAP HANA databases using OMi MP for SAP HANA.

Task 1: Adding Remote Managed Node to OMi 10.x Console

> **Note:** OMi MP for SAP HANA monitors SAP HANA databases through remote monitoring. The remote managed node is a node outside the HANA system that needs to be configured and added to or OMi 10.x for monitoring SAP HANA databases.

Before you begin monitoring, follow these steps to add the nodes.

1. Open the Monitored Nodes pane from Administration:

   On OMi 10.x, click **Administration > Setup and Maintenance > Monitored Nodes**.

2. In the Node Views pane, click **Predefined Node Filters > Monitored Nodes** and then click  . Select **Computer > Windows** or **Unix** from the menu. The Create New Monitored Node dialog box appears.

3. Specify the Primary DNS Name, IP address, Operating System, and Processor Architecture of the node and click **OK**.

   The newly created node is saved as a Configuration Item (CI) instance in Run-time Service Model (RTSM).

   > **Caution:** Ensure not to install any other software on the SAP HANA system. The components of SAP HANA can only be installed by certified hardware partners, or any person holding certification. Hence, the Operations Agent should not be installed on the SAP HANA system. It is strongly recommended to use remote managed node for monitoring HANA system.
   >
   > For more information, see SAP documentation.

> **Note:** Ensure to activate the remote managed node with Operations Agent on OMi server and grant certificate.

Task 2: Deploying the HANA Discovery Aspect

To discover the SAP HANA databases in the environment, deploy the aspects based on the deployment scenarios to the remote managed node:

- If the managed node monitors the SAP HANA nodes based on Standard, MCOD or MCOS deployment scenario, then deploy only the HANA System DB Service Discovery aspect.
- If the managed node monitors the SAP HANA nodes based on MDC deployment scenario, then first deploy the HANA System DB Service Discovery aspect and then deploy the HANA Tenant DB Service Discovery aspect.

To deploy the aspect, follow these steps:

> **Note:** Before you deploy the aspect, you must ensure to place the HANA JDBC driver in the following instrumentation directory on the managed node: **%ovdatadir%bin\instrumentation**.

1. Open the Management Templates & Aspects pane:

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane:

   Configuration Folders > Database Management > SAP HANA > Aspects

3. In the HANA Aspects folder, click the **HANA System DB Service Discovery or HANA Tenant DB Service Discovery** that you want to deploy, and then click  . The Assign and Deploy wizard opens.

4. In the **Configuration Item** tab, click the remote managed node CI and then click **Next** to go to **Required Parameters**.

5. In the **Required Parameters** tab, you must specify the mandatory parameters.

a. **For HANA System DB Service Discovery aspect**,

Parameter Name	Description
SystemDB's JDBC URL	JDBC URL to connect with HANA system database. For example, `jdbc:sap://hanavm1.ind.com:31015;hanavm1:31015?reconnect=true&timeout=0`
Username for HANA System DB	Username to connect to HANA system database.
Password for HANA System DB	Password to connect to HANA system database.

b. **For Tenant DB Service Discovery aspect**,

Parameter Name	Description
TenantDB's JDBC URL	JDBC URL to connect with HANA tenant database. For example, `jdbc:sap://hanavm1.ind.com:32017;hanavm1:32017?reconnect=true&timeout=0`
Username for HANA Tenant DB	Username to connect to HANA tenant database.
Password for HANA Tenant DB	Password to connect to HANA tenant database.

6. Depending on the aspect you are deploying, perform one of the following steps in the **Parameter Summary** tab:

a. **For HANA System DB Service Discovery aspect**

i. The **SystemDB's JDBC URL** and **Frequency for running SystemDB Discovery (Hours)** are the parameters available in this tab. Select the parameter you want to edit and click  **Edit**. The Edit parameter window appears.

ii. In the **Instance Values** pane, double click the parameter and edit the value.

iii. In the **Dependent Values** pane, select the parameter you want to edit and click **Edit**. The Edit Parameter window is displayed.

> **Note:** For SSL configurations, you must specify the value for the **Encrypt** parameter. You need to set the value to true to enable SSL encryption.
>
> Based on your set up, you need to specify the values for other parameters related to SSL.

> **Note:** The **High Availability Setup** parameter is applicable for High Availability scenario only. The default value is **False**. For High Availability scenario, set the value to **True**.

iv. Enter the value and click **OK**.

v. Click **OK** again and then click **Next**.

b. **For HANA Tenant DB Service Discovery aspect**

i. The **TenantDB's JDBC URL** and **Frequency for running TenantDB Discovery (Hours)** are the parameters available in this tab. Select the parameter you want to edit and click **Edit**. The Edit parameter window appears.

ii. In the **Instance Values** pane, double click the parameter and edit the value.

iii. In the **Dependent Values** pane, select the parameter you want to edit and click **Edit**. The Edit Parameter window is displayed.

> **Note:** The **High Availability Setup** parameter is applicable for High Availability scenario only. The default value is **False**. For High Availability scenario, set the value to **True**.

iv. Enter the value and click **OK**.

v. Click **OK** again and then click **Next**.

7. *(Optional)* In **Parameter Summary** tab on OMi 10.x, click **Next** to go to the **Configure Options** tab.

   If you do not want to enable the assignment immediately, clear the or Enable Assignment(s) check box.

   You can enable the assignment later using the Assignments & Tuning pane.

8. Click **Finish**.

> **Note:** After the **HANA System DB Service Discovery** or **HANA Tenant DB Service Discovery** aspect is deployed, a message stating the `Assignment and deployment jobs created` appears. To check the status of the deployment job, go to the following location:
>
> On OMi 10.x, click **Administration > Monitoring > Deployment Jobs**.

Task 3: Verifying Discovery

After you deploy the **HANA System DB Service Discovery** or **HANA Tenant DB Service Discovery** aspect, you must verify if the CIs are populated in the Browse Views.

To view the CIs populated in the Browse Views pane, follow these steps:

1. Open the Event Perspective pane:

   On OMi 10.x, click **Workspaces > Operations Console > Event Perspective**.
2. In the Browse Views pane, select the **HANA_Topology** or **Hana_Deployment** view.

   The CIs are populated in the Browse Views pane.

Task 4: Deploying the HANA Management Templates or HANA Aspects

This section provides information about user privilege required for monitoring, data collection, deploying management templates and aspects. For more information about deploying HANA Management Template, go to Task 4a: Deploying HANA Management Templates and for more information about deploying HANA Aspects, go to Task 4b: Deploying HANA Aspects.

User Privilege

OMi MP for SAP HANA user must be assigned the MONITORING role of the standard SAP HANA database, that contains the read-only privileges for all the system and monitoring views.

> **Note:** In case of MDC deployment scenario, ensure the following:

- The roles should be added to be both the System DB and all the tenants DB.
- In this deployment scenario, the OMi MP for SAP HANA user must be assigned the `MONITORING` roles of the standard SAP HANA database.

Data Collection

Frequency (polling interval) at which each Aspect must be monitored is predefined with a default value in a specific frequency parameter. Frequency parameter is an expert parameter that is defined for each of the metrics regardless of whether they are for generating events or not.

Following are the four predefined frequency parameters:

Parameter	Frequency
Very High	5 mins
High	15 mins
Medium	1 hour
Low	24 hours

After Management Templates and Aspects are deployed, collector is triggered based on the predefined frequency parameter in a specific Aspect. You can modify the default value of the parameter at the following levels:

- During deployment of the Management Template or Aspects using the Management Templates & Aspects pane.
- After deployment using the Assignments & Tuning pane.

Task 4a: Deploying HANA Management Templates

You must deploy the HANA System DB Discovery aspect even if the CIs are already populated by any other source such as SiteScope, DDM and so on. Also deploy the HANA Tenant DB Discovery aspect if tenants are available.

For more information, see Task 2: Deploying the HANA Discovery Aspect.

You can deploy the HANA Management Templates by following these steps:

1. Open the Management Templates & Aspects pane:

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane:

   Configuration Folders > Database Management > SAP HANA > Management Templates

3. In the **HANA Management Templates** folder, select the **Management Template** that you want to deploy, and then click  . The Assign and Deploy wizard opens.

4. In the **Configuration Item** tab, select the discovered HANA system to which you want to assign the Management Template, and then click **Next** to go to the **Required Parameters** tab.

   > **Note:** You do not need to specify the values for the required parameters as these have been already specified while deploying the HANA Service Discovery Aspect.

5. Click **Next** to go to **Parameter Summary** tab on OMi 10.x.

   > **Note:** In **Parameter Summary** tab on OMi 10.x, you can override the default values of any parameter. You can specify a value for each parameter at the Management Template level. By default, parameters defined as expert parameters are not shown. To view expert parameters, click  **Show Expert Parameters**.

6. *(Optional)*. In **Parameter Summary** tab on OMi 10.x, select the **SAP HANA Database SID** parameter, and click  **Edit**. The Edit Instance Parameter: SAP HANA database SID window appears.

7. *(Optional)*. In the Dependent Values pane, you can edit the values by following these steps:

   a. Select a parameter and click  **Edit**.

      For example, you can select **Frequency for Service Status**. The Edit Parameter: Frequency for Service Status window appears.

   b. Click **Value**, specify the value.

   c. Click **OK**.

8. In **Parameter Summary** tab on OMi 10.x, click **Next** to go to **Configure Options** tab.

9. *(Optional)*. If you do not want to enable the assignment immediately, clear the or Enable Assignment(s) check box.

   On OMi 10.x, clear the **Enable Assignment(s)** check box.

   You can enable the assignment later using the Assignments & Tuning pane.

10. Click **Finish**.

Task 4b: Deploying HANA Aspects

You must deploy the HANA System DB Discovery aspect even if the CIs are already populated by any other source such as SiteScope, DDM and so on. Also deploy the HANA Tenant DB Discovery aspect if tenants are available.

For more information, see Task 2: Deploying the HANA Discovery Aspect

You can deploy HANA Aspects to the remote managed nodes by following these steps:

1. Open the Management Templates & Aspects pane:

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane:

   Configuration Folders > Database Management > SAP HANA > Aspects

3. In the Management Templates & Aspects pane, click the HANA Aspect that you want to deploy, and then click  . The Assign and Deploy wizard opens.

4. In the **Configuration Item** tab, click the remote managed node CI to which you want to assign the Aspect, and then click **Next** to go to **Required Parameters**.

   > **Note:** To view remote managed node, select the **Also Show CIs of Type Node** check box.

5. In the **Required Parameters** tab, update the SAP HANA database SID.

6. Click **Next** to go to **Parameter Summary** tab on OMi 10.x.

   > **Note:** In **Parameter Summary** tab on OMi 10.x, you can override the default values of any parameter. You can specify a value for each parameter at the Aspect level. By default, parameters defined as expert parameters are not shown. To view expert parameters, click  **Show Expert Parameters**.

7. In **Parameter Summary** tab on OMi 10.x, select the **SAP HANA Database SID** parameter, and click  **Edit**. The Edit Instance Parameter: SAP HANA database SID window appears.

8. *(Optional)*. In the Dependent Values pane, you can edit the values by following these steps:
   a. Select a parameter and click  **Edit**. For example, you can select **Frequency for Service Status**.

      The Edit Parameter: Frequency for Service Status window appears.

   b. Click **Value**, specify the value and click **OK**.
   c. Click **OK**.
9. Click **Next** to go to **Configure Options** tab.
10. *(Optional)*. If you do not want to enable the assignment immediately:

    On OMi 10.x, clear the **Enable Assignment(s)** check box.

    You can enable the assignment later using the Assignments & Tuning pane.
11. Click **Finish**.

Monitoring SAP HANA Environment

After you deploy Management Template and Aspects, you can analyze the status and health of HANA CIs from the following perspectives:

Event Perspective

The Event Perspective provides information of events from an event perspective. In the Event Perspective, you can view the event information of the SAP HANA CI that are monitored by OMi MP for SAP HANA.

To view the Event Perspective of SAP HANA CIs, follow these steps:

1. Open the Operations Management pane:

   On OMi 10.x, click **Workspaces > Operations Console > Event Perspective**.

   The View Explorer pane appears.
2. In the **Browse Views** tab, select **HANA_Deployment** that contains the SAP HANA CIs for which you want to view the events. Alternatively, you can use **Search** tab to find a SAP HANA CI.
3. Click the SAP HANA CI for which you want to view the Event Perspective. The list of events for the selected SAP HANA CI appears on the Event Browser pane.

   When you click an event from the Event Browser, the Event Details pane opens where you can view the following details:

- **General** - Displays the detailed information about the selected event such as Severity, Lifecycle State, Priority, Related CI and so on.
- **Additional Info** - Displays more detailed information about the attributes of the selected event.
- **Source Info** - Displays an overview of the information available about the source of the selected event.
- **Actions** - Displays the list of actions available for a selected event. There are two types of possible actions: User Actions and Automatic Action.
- **Annotations** - Displays a list of the annotations attached to the selected event.
- **Custom Attributes** - Displays a list of the attributes that either an administrator or the responsible user manually configured and added to the selected event.
- **Related Events** - Displays an overview of all the events that are related to the event selected in the Event Browser.
- **History** - Displays the history of the selected event.
- **Resolver Hints** - Displays the information used to identify the node and CI associated with an event.
- **Instructions** - Displays instruction information designed to help operators handle the associated event.
- **Forwarding** - Displays the transfer of ownership details if any, for the events.

Health Perspective

The Health Perspective provides a high-level view of the overall health information of the related CIs in the context of events. In the Health Perspective, you can view the health information of the SAP HANA CIs that are monitored by OMi MP for SAP HANA.

To view the Health Perspective of SAP HANA CIs, follow these steps:

1. Open the Operations Management pane:

   On OMi 10.x, click **Workspaces > Operations Console > Health Perspective**.

   The View Explorer pane appears.

2. In the **Browse Views** tab, select **HANA_Deployment** that contains the SAP HANA CIs for which you want to view the health related events. Alternatively, you can use **Search** tab to find a SAP HANA CI.
3. Click the SAP HANA CI for which you want to view the Health Perspective. The list of health related events for the selected SAP HANA CI appears on the Event Browser pane.

When you click an event from the Event Browser pane, the following panes appear:

- **Health Top View** - Displays the health top view of the selected event.
- **Health Indicators** - Displays the Key Performance Indicators (KPIs) and HIs related to the CI that you select from the Health Top View pane.
- **Actions** - Displays the list of actions available for a selected event.

Performance Perspective

Performance Perspective enables you to populate graphs from existing graph templates. You can also plot customized graphs by selecting the required metrics for a specific CI.

To view the Performance Perspective of SAP HANA CIs using graphs, follow these steps:

1. Open the Operations Management pane:

   On OMi 10.x, click **Workspaces > Operations Console > Performance Perspective**.

   The View Explorer pane appears.

2. In the **Browse Views** tab, select **HANA_Deployment**. The list of CIs appear. Select a specific CI of the type **hana_instance**. The performance pane appears, which lists the default graphs available for the **HANA_Deployment** view.

3. To create graphs, click the graph you want to plot from the **Graphs** tab, and then click  **Draw Graphs**. The selected graph is plotted on the right pane.

> **Note:** For more information about Event Perspective, Health Perspective, and Performance Perspective, see the *Operations Manager i Concepts Guide*.

Chapter 3: Customizing Management Templates

OMi MP for SAP HANA can be customized to suit your monitoring requirements. You can edit the existing SAP HANA Management Templates or create new SAP HANA Management Templates to monitor any database environment.

The following section provides information about creating new management templates or editing the existing management templates:

- Creating SAP HANA Management Templates
- Editing SAP HANA Management Templates

Creating HANA Management Templates

The following section provides information on creating Management Templates for HANA:

1. Open the Management Templates & Aspects pane:

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane:

   Configuration Folders > Database Management > SAP HANA > Management Templates

3. Select the HANA configuration folder and if you need to create a new configuration folder, click . The Create Configuration Folder pane opens.

4. Type the name of the new configuration folder and the description. For example, you can type the new configuration folder name as Test.

5. Click **OK**. The new configuration folder is created.

   Configuration Folders > Database Management > SAP HANA > Management Templates > Test

6. In the Management Templates & Aspects pane, select the new configuration folder and click and then click **Management Template**. The Create Management Template wizard opens.

7. In the **General** tab, type a **Name** for the new HANA Management Template and click **Next**.

A HANA Management Template enables you to manage HANA CIs and all the related dependent CIs.

8. Select **HANA_Deployment** from the list as the Topology View.

   The HANA_Deployment shows the HANA CIs and all the related CITs.

9. Click an item in the topology map to select the **CI Type** of the CIs that this Management Template enables you to manage. This is the type of CI to which the Management Template can be assigned. For example, you can select HANA to monitor SAP HANA databases.

   Click **Next**.

10. In the **Aspects** tab, click , and then click **Add Existing Aspect** to add existing Aspects to the new HANA Management Template. The Add Existing Aspect dialog box opens. Select the Aspects that you want to add, and then click **OK**.

11. For each Aspect that you add, you must specify at least one **Target CI**.

    Click an Aspect in the list, and then in the topology map, click the CIT you want the Aspect to monitor when this Management Template is assigned. (Press **CTRL** to select several CITs.) Each CIT that you select here must correspond to one of the CI types assigned within the Aspect itself (or a child of one of those CITs). For example, you can select HANA CI from the topology map.

12. In the **Parameters** tab, you see a list of all the parameters from the Aspects that you added to this Management Template.

    To combine parameters:

    a. Press **CTRL** and click the parameters that you want to combine.

    b. Click the .

       The Edit/Combine Parameters dialog box opens.

    c. Type a **Name** for the combined parameters.

    d. *(Optional)*. Specify a **Description**, **Default Value**, and whether the combined parameter is **Read Only**, an **Expert Setting**, or **Hidden**.

       You can specify either a specific default value, or you can click **From CI Attribute** and then browse for a CI attribute. When you specify a CI attribute, Operations Management sets the parameter value automatically during the deployment of the underlying policy templates, using the actual value of this attribute from the CI. You can also change values of conditional parameters. (The conditions are read-only and cannot be changed at Management Template level.)

Read Only prevents changes to the parameter value when the Management Template is assigned to a configuration item. Hidden also prevents changes, but additionally makes the parameter invisible when the Management Template is assigned, and during parameter tuning. Users can choose whether to show expert settings when they make an assignment.

e. Click **OK**.

You can also edit the parameters without combining them, to override the defaults in the Aspects or policy templates. Click one parameter, and then click . The Edit/Combine Parameters dialog box opens.

13. In the Create Management Template wizard, click **Finish** to save the Management Template and close the wizard.

The new Management Template appears in the Management Templates & Aspects pane.

Editing HANA Management Templates

You can edit the HANA Management Templates and modify the following components:

- Parameters
- HANA Aspects

Editing Parameters

Use Case: You are using Essential HANA Management Template to monitor SAP HANA databases in your environment. You are monitoring the inactive services count in the environment and want to modify the parameters corresponding to services count to closely monitor the services.

To closely monitor inactive services in your environment, you must modify the inactive services count parameter.

1. Open the Management Templates & Aspects pane:

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane:

   Configuration Folders > Database Management > SAP HANA > Management Templates > Essential HANA Management Template

3. Select the **Essential HANA Management Template** from the list, and then click  . The Edit Management Template dialog box opens.
4. Click the **Parameters** tab. The list of parameters appear.
5. Double-click the **Frequency for Inactive Services Count** parameter. The Edit/Combine Parameters window appears.
6. You can change the default value by using the drop down text. For example, you can change the value of the parameter tablespace with low free space frequency to High from Medium.
7. Click **OK**. The Edit Management Template dialog box opens.
8. Click **OK**. The version of the HANA Management Template is incremented.

> **Note:** The version number of the HANA Management Template is incremented when any customizations are made to the HANA Management Template.

Editing Aspects

Use Case: You are using Extensive HANA Management Template to monitor a SAP HANA databases. You do not want to use some Aspects which are part of the Extensive HANA Management Template.

1. Open the Management Templates & Aspects pane:

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.
2. In the Configuration Folders pane:

   Configuration Folders > Database Management > SAP HANA > Management Templates > Essential HANA Management Template
3. Select the **Essential HANA Management Template** from the list, and then click  . The Edit Management Template dialog box opens.
4. Click the **Aspects** tab. The list of Aspects appear.
5. Select the Aspect that you want to delete from the list.
6. Click  to delete the selected Aspect.
7. Click **OK**. The version of the HANA Management Template is incremented.

Chapter 4: Components

The OMi MP for SAP HANA includes the following components for monitoring SAP HANA databases in an environment:

HANA Management Templates

The Management Templates consists of several Aspects which enable you to monitor SAP HANA databases based on the criticality and type of the environment. By default, the OMi MP for SAP HANA consists of out-of-the-box HANA Management Templates. You can deploy the out-of- the-box Management Template with the default parameters or you can customize the Management Templates based on your requirements. In addition, you can also create Management Templates based on the monitoring requirements using the SAP HANA Aspects.

The OMi MP for SAP HANA comprises the following Management Templates:

How to Access Management Templates

1. Open the Management Templates & Aspects pane:

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. Click **Configuration Folders > Database Management > SAP HANA > Management Templates**.

Tasks

How to Deploy HANA Management Templates

For information about deploying Management Templates, see Task 4: Deploying the HANA Management Templates or HANA Aspects.

How to Automatically Assign HANA Management Templates and HANA Aspects

To automatically assign HANA Management Templates and HANA Aspects, follow these steps:

1. Open the Automatic Assignment Rules:

   On OMi 10.x, click **Administration > Monitoring > Automatic Assignment Rules**.

   Automatic Assignment Rules consists of the Auto-Assignment Rules pane at the top, and a Parameters list pane at the bottom.

2. Click  in the toolbar of the Auto-Assignment Rules pane and select the appropriate option. The Create Auto-Assignment Rule wizard is shown.
3. In the **Select Target View** tab, select the **HANA_Topology** View containing the CIs for which you want to create an automatic assignment, and click **Next** to go to Select Item to Assign.
4. In the **Select Item to Assign** tab, click the HANA Management Template or Aspect that you want to automatically assign to all CIs with a CI type appearing in the selected view.

   > **Note:** The list shows only the management templates that have a root CI type that appears in the view that you selected or, in case an Aspect is auto-assigned it shows the compatible aspects.

   The latest version of the Management Template or Aspect that you want to assign is selected by default. If required, select a different version in column **Version**.

5. Click **Next** to go to **Required Parameters** tab.
6. This step lists all mandatory parameters in the Management Template that do not yet have a value. As they are mandatory, however, all listed parameters *must* be given a value before the Management Template can be deployed.

   If all required values are specified, you can choose one of the following actions:

- Click **Finish** to assign the configuration object to the selected CI and close the wizard or dialog.
- Click **Next** to go to **Parameter Summary** tab on OMi 10.x, where you can override the default value of any parameter, including those that are not required.

> **Note:** To access step **Configure Options**, click **Next** in this step, and **Next** again in the **Parameter Summary** tab on OMi 10.x.

To change a parameter, double-click it, or select it in the list and click  **Edit**.

- For standard parameters, the Edit Parameter dialog opens.

  Click **Value**, specify the value, and then click **OK**.
- For instance parameters, the Edit Instance Parameter dialog opens.

  Add instance values, and then for each instance value, specify dependent parameter values. After you specify the instances and dependent parameter values, click **OK**.

7. *(Optional)*. In the **Parameter Summary** tab on OMi 10.x, specify a value for each parameter that needs to be monitored against a different value than the default value.

   To change a parameter, double-click it, or select it in the list and click  **Edit**.

   - For standard parameters, the Edit Parameter dialog opens.

     Click **Value**, specify the value, and then click **OK**.
   - For instance parameters, the Edit Instance Parameter dialog opens.

     Add instance values, and then for each instance value, specify dependent parameter values. After you specify the instances and dependent parameter values, click **OK**.

   Click **Next** to go to the **Configure Options** tab, or **Finish** to save the assignment a nd close the wizard.
8. *(Optional)*. In the **Configure Options** tab, clear the **Enable Assignment(s)** check box on OMi 10.x if you do not want to activate the assignment immediately. You can activate automatic assignment rules later using Automatic Assignment Rules at **Administration > Monitoring > Assignments & Tuning** on OMi 10.x.
9. Click **Finish** to save the changes and close the wizard. The assignment rule is added to the list of auto-assignment rules.

You can check if the automatic assignment rule successfully created the expected assignments as follows:

1. Open the Assignments & Tuning pane:

   On OMi 10.x, click **Administration > Monitoring > Assignments & Tuning**.

2. In the **Browse Views** tab, select the view you identified while creating your automatic assignment rule.

3. Expand the view, and select a node that corresponds to the root CI type of the assigned item. Assignments created as a result of Automatic Assignment Rules are shown in the list of assignments at the top of the right pane, and have the value `AutoAssignment` in the column **Assigned By**.

You can consider the following options for tuning the assignment:

- Use the Auto-Assignment Rules pane to tune the parameter values for all assignments triggered by the automatic assignment rule.
- Use the Assignments pane to tune, redeploy, delete, and enable or disable individual assignments.

How to Display an Assignment Report for a HANA Management Template

1. Select the Management Template you want to create the report for.

2. Click  **Generate Assignment Report** in the Management Templates & Aspects pane.

   The preconfigured Assignment Report opens.

You can view additional types of reports from the Assignments & Tuning pane.

Essential HANA Management Template

The Essential HANA Management Template monitors SAP HANA database primary areas such as availability, query performance, backup status, along with critical infrastructure areas of CPU, Memory and Disk.

How to Access the Essential HANA Management Template

1. Open the Management Templates & Aspects pane:

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. Click **Configuration Folders > Database Management > SAP HANA > Management Templates > Essential HANA Management Template**.

User Interface Reference

Management Template - General

Provides an overview of the attributes of the Management Template.

UI Element	Description
Name	Essential HANA Management Template.
Description	Monitors SAP HANA database primary areas such as availability, query performance, backup status, and so on along with critical infrastructure areas of CPU, Memory and Disk.
ID	A unique Identifier for the GUID version.
Version ID	A unique identifier for this version of the Essential HANA Management Template.
Version	The current version of the Management Template. In this instance, the version of the Management Template is 1.0.

Management Template - Topology View

UI Element	Description
Topology View	HANA_Topology
CI Type	HanaDatabase

Management Template - Aspects

The Essential HANA Management Template comprises the following Aspects:

- HANA Backup Status
- HANA Database Availability
- HANA Database CPU Usage
- HANA Database Memory Usage
- HANA System Infrastructure Health

  For more information on aspects and their policies, see " Aspects" on page 38.

Extensive HANA Management Template

The Extensive HANA Management Template monitors SAP HANA database primary areas such as availability, query performance, backup status, license expiry, internal alerts etc. along with critical infrastructure areas of CPU, Memory and Disk

How to Access the Extensive HANA Management Template

1. Open the Management Templates & Aspects pane:

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. Click **Configuration Folders > Database Management > SAP HANA > Management Templates > Extensive HANA Management Template**.

User Interface Reference

Management Template - General

Provides an overview of the attributes of the Management Template.

UI Element	Description
Name	Extensive HANA Management Template.
Description	Monitors SAP HANA database primary areas such as availability, query performance, backup status, and so on along with critical infrastructure areas of CPU, Memory and Disk.
ID	A unique identifier for the GUID version.
Version ID	A unique identifier for this version of the Extensive HANA Management Template.
Version	The current version of the Management Template. In this instance, the version of the Management Template is 1.0.

Management Template - Topology View

UI Element	Description
Topology View	HANA_Topology
CI Type	HanaDatabase

Management Template - Aspects

The Extensive HANA Management Template comprises the following Aspects:

- HANA Backup Status
- Hana Database Alerts
- HANA Database Availability
- HANA Database CPU Usage
- HANA Database Memory Usage
- HANA Database Space Usage
- HANA License Status
- HANA System Infrastructure Health
- HANA Work Load

  For more information on aspects and their policies, see " Aspects" on page 38.

HANA Aspects

HANA Aspect comprises policy templates, instrumentation, and parameters for monitoring the health and performance of SAP HANA databases.

How to Access HANA Aspects

1. Open the Management Templates & Aspects pane:

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.
2. Click **Configuration Folders > Database Management > SAP HANA > Aspects**.

Tasks

How to Deploy HANA Aspects

For information about deploying SAP HANA Aspects, see Task 4b: Deploying SAP HANA Aspects.

How to Create HANA Aspects

1. Open the Management Templates & Aspects pane:

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane:

   Configuration Folders > Database Management > SAP HANA > Aspects

3. In the Configuration Folders pane, click the configuration folder in which you want to create the new Aspect. If you want to create a new configuration folder, click .

4. In the Management Templates & Aspects pane, click , and then click **Aspect**. The Add New Aspect wizard opens.

5. In the **General** tab, type a unique **Name** for the new Aspect and click **Next**.

6. Each Aspect enables you to manage one feature or characteristic of one or more types of configuration items. In the **CI Types** tab, select one or more **Available CI Types** to which this Aspect can be assigned, and then click to add them to the list of assigned CITs. Press **CTRL** or **SHIFT** to select several CITs.

   > **Note:** You need to assign the Aspects to the HANA Database CIT.

7. Click **Next**.

8. In the **Aspects** tab, click **Add Existing Aspect**. The Add Existing Aspect dialog box opens, which enables you to select an existing Aspect that you want to nest within this Aspect. Click an Aspect, and then click **OK**. Click **Next**.

9. In the **Policy Templates** tab, click **Add Policy Templates From List** on OMi 10.x. The Add Policy Templates From List dialog box opens. Select the policy templates that you want to add, and then click **OK**. Press **CTRL** or **SHIFT** to select several policy templates.

10. If suitable Policy Templates do not exist, follow these steps to add a new Policy Template:

    a. Click , and then click **Add New Policy Template** to create them from here. The Add Policy Templates from List dialog box opens.

    b. Select the Measurement Threshold Policy Template from the **Type** drop-down list and click **OK**.

    c. Select the **Version** of the policy templates that you want to add.

> **Note:** Each modification to a policy template is stored as a separate version. Aspects contain specific versions of policy templates. If a new version of a policy template becomes available later, you have to update the Aspect to include the latest version.

d. In the Add Policy Templates from List dialog box, click **OK**. A new Policy Template is added.

11. *(Optional).* In the **Policy Templates** tab, click the policy template to which you want to add a deployment condition, click , and then click the **Edit Deployment Condition**.

    The Edit Deployment Condition dialog box opens, which enables you to specify deployment conditions for the selected policy template.

    Set the condition and then click **OK**.

12. Click **Next**.

13. In the **Parameters** tab, you see a list of all the parameters from the policy templates that you added to this Aspect.

    To combine parameters:

    a. Press **CTRL** and click the parameters that you want to combine.

    b. Click . The Edit/Combine Parameters dialog box opens.

    c. Type a **Name** for the combined parameters.

    d. *(Optional).* Specify a **Description**, **Default Value**, and whether the combined parameter is **Read Only**, an **Expert Setting** or **Hidden**.

    > **Note:** Read Only prevents changes to the parameter value when the Aspect is assigned to a CI. Hidden also prevents changes, but additionally makes the parameter invisible. Users can choose whether to show expert settings when they make an assignment.

    e. You can set either a specific default value, or you can click **From CI Attribute** and then browse for a CI attribute. When you specify a CI attribute, Operations Console sets the parameter value automatically during deployment of the policy templates, using the actual value of this attribute from the CI. You can also set conditional parameter values here.

    f. Click **OK**.

    You can also edit the parameters without combining them, to override the defaults in the policy template. Click one parameter, and then click . The Edit/Combine Parameters dialog box opens.

14. In the Add New Aspect wizard, click **Finish** to save the Aspect and close the wizard.

    The new Aspect appears in the Management Templates & Aspects pane.

Aspects

SAP HANA Aspects are used to monitor the building blocks or units of SAP HANA databases.

User Interface Reference

General	Provides an overview of the general attributes of the SAP HANA Aspects.
CI Type	The type of CIs that the Aspect can be assigned to. This is the type of CI to which the Management Template can be assigned. The SAP HANA Aspects contain the HANA System and HANA Database CITs.
Instrumentation	Provides a single package which contains the binaries for discovery, collection, and data logging.
Aspects	Provides an overview of any Aspects that the SAP HANA Aspects contains. You can expand each item in the list to see more details about the nested Aspect.
Policy Templates	Provides an overview of the policy templates that the SAP HANA Aspect contains. You can expand each item in the list to see more details about the policy template.

The OMi MP for SAP HANA comprises the following SAP HANA Aspects:

HANA Base

This is SAP HANA Base Aspect.

CI Type	Policy Template	Indicator	Description	Policy Type
hana_ instance	HANA_Low	NA	Runs JDBC collector/analyzer Low schedule.	Scheduled Task
hana_ instance	HANA_ Medium	NA	Runs JDBC collector/analyzer every MEDIUM schedule.	Scheduled Task

CI Type	Policy Template	Indicator	Description	Policy Type
hana_ instance	HANA_High	NA	Runs JDBC collector/analyzer every HIGH schedule.	Scheduled Task
hana_ instance	HANA_ VeryHigh	NA	Runs JDBC collector/analyzer every VERYHIGH schedule.	Scheduled Task

HANA Backup Status

Monitors the data and log backup status.

CI Type	Policy Template	Indicator	Description	Policy Type
hana_ instance	HANA_LogBackupStatus	NA	Last log backup status	Measurement Threshold
hana_ instance	HANA_ CompleteDataBackupStatus	NA	Last complete data backup status	Measurement Threshold
hana_ instance	HANA_ CompleteDataBackupAge	NA	Time since last complete data backup	Measurement Threshold

Hana Database Alerts

Monitors SAP HANA internal alerts.

CI Type	Policy Template	Indicator	Description	Policy Type
hana_ instance	HANA_Collect_ InternalEvents	NA	Policy to collect HANA internal events	ConfigFile
hana_ instance	HANA_Collect_Alerts	NA	Policy to collect HANA alerts	ConfigFile

HANA Database Availability

Monitors SAP HANA connection status and services running on all instances.

CI Type	Policy Template	Indicator	Description	Policy Type
hana_ instance	HANA_SerivcesStatus	NA	Status of HANA services	Measurement Threshold
hana_ instance	HANA_DB_ Connection_Status	NA	HANA DB Connection status check	Measurement Threshold
hana_ instance	HANA_ InactiveserviceCnt	NA	Number of inactive services	Measurement Threshold

HANA Database CPU Usage

Monitors the CPU Usage of each of the HANA Services.

CI Type	Policy Template	Indicator	Description	Policy Type
hana_ instance	HANA_ ServiceCPUUsage	NA	CPU Usage by HANA Services	Measurement Threshold

HANA Database Memory Usage

Monitor SAP HANA memory usage in terms of used memory, peak used memory, amount of memory used for column tables, delta memory etc.

CI Type	Policy Template	Indicator	Description	Policy Type
hana_ instance	HANA_ NonPartitionRcrdCount	NA	Records of not partitioned Tables	Measurement Threshold
hana_ instance	HANA_ RcrdCountColTblPartition	NA	Record Count of Column Table Partition	Measurement Threshold
hana_ instance	HANA_ IndxSrvrUsdHeapMemory	NA	Heap memory usage of the Index server	Measurement Threshold
hana_ instance	HANA_ DeltaMemRecordCount	NA	Delta Memory Record Count	Measurement Threshold
hana_ instance	HANA_ SharedMemoryUsage	NA	Shared Memory Usage	Measurement Threshold
hana_ instance	HANA_ ColStoreMemAllocUsage	NA	Column Table Size with Respect to Memory Allocation Limit	Measurement Threshold

CI Type	Policy Template	Indicator	Description	Policy Type
hana_ instance	HANA_DeltaMemorySize	NA	Size of Delta Memory	Measurement Threshold

HANA High Availability Monitoring

This aspect is used for HANA HA System specific monitoring. For example, System replication status.

Note: Deploy this aspect only if you want to monitor SAP HANA high availability.

CI Type	Policy Template	Indicator	Description	Policy Type
hana_ instance	HANA_ HAReplicationStatus	NA	This Policy alerts if the System Replication status of a HA System is not active	Measurement Threshold

HANA Database Space Usage

Monitors SAP HANA database space usage in terms of disk usage, physical memory, record count of column table partition, etc.

CI Type	Policy Template	Indicator	Description	Policy Type
hana_ instance	HANA_DiskUsage	NA	Total Disk Usage	Measurement Threshold
hana_ instance	HANA_ MemTotalUsage	NA	Total Physical Memory Used	Measurement Threshold
hana_ instance	HANA_ PhyMemAllocUsage	NA	Used Physical Memory against Allocation Limit	Measurement Threshold

HANA License Status

Monitors the licensed memory usage and days to license expire.

CI Type	Policy Template	Indicator	Description	Policy Type
hana_ instance	HANA_ LicenseExpiration	NA	Number of Days left for license expiration	Measurement Threshold

CI Type	Policy Template	Indicator	Description	Policy Type
hana_ instance	HANA_ LicensedMemoryUsage	NA	Percentage of licensed memory used	Measurement Threshold

HANA System DB Service Discovery

Discovers the SAP HANA System database and the related processes.

CI Type	Policy Template	Indicator	Description	Policy Type
host_ node	HANA_Message	NA	General OPC message policy for HANA	Open Message Interface
host_ node	HANA_ SystemDB_ Discovery	NA	HANA System DB discovery policy discovers HANA System DB infrastructure	Service Auto-Discovery
host_ node	HANA_ MPLogMonitor	NA	Monitors the HANA MP script, discovery and collector log files	LogFile Entry
host_ node	HANA_ Configuration	NA	HANA configuration details for System DB discovery.	ConfigFile

HANA System Infrastructure Health

Monitors the host resources utilization.

CI Type	Policy Template	Indicator	Description	Policy Type
hana_ instance	HANA_Collect_ SysHealth	NA	Policy to collect system resources summary	ConfigFile

HANA Tenant DB Service Discovery

Discovers the SAP HANA Tenant databases and the related processes.

CI Type	Policy Template	Indicator	Description	Policy Type
host_ node	HANA_ TenantDB_ Discovery	NA	HANA Tenant DB discovery policy discovers HANA Tenant DB infrastructure Prerequisite : "HANA System DB Service Discovery Aspect must be deployed first."	Service Auto-Discovery
host_ node	HANA_ TenantDB_ Configuration	NA	HANA configuration details for Tenant DB discovery.	ConfigFile

HANA Work Load

Monitors SAP HANA workload interms of long running statements, idle cursors etc.

CI Type	Policy Template	Indicator	Description	Policy Type
hana_ instance	HANA_ExecutionCount	NA	Total count of executed statements	Measurement Threshold
hana_ instance	HANA_ CurrentMemoryUsageRate	NA	Total size of used memory per minute	Measurement Threshold
hana_ instance	HANA_LongIdleCursor	NA	Number of long idle cursors	Measurement Threshold
hana_ instance	HANA_ ConnectionCountUsage	NA	Percentage of connections used	Measurement Threshold
hana_ instance	HANA_LongRunninStmnt	NA	Number of long running statements	Measurement Threshold
hana_ instance	HANA_Collect_ TenantsSummary	NA	Policy to collect tenants summary	ConfigFile
hana_ instance	HANA_ BlockedTransactCount	NA	Number of blocked transactions	Measurement Threshold
hana_ instance	HANA_LongTransactCount	NA	Number of long transactions	Measurement Threshold
hana_ instance	HANA_ UncommitedTransactCount	NA	Number of uncommited transactions	Measurement Threshold
hana_ instance	HANA_LastSavePointTime	NA	Last save point time	Measurement Threshold

Parameters

Parameters are variables that are an integral component of HANA Management Templates, HANA Aspects, and Policy Templates. Each parameter corresponds to a variable. Parameters contain default values that are used for monitoring the SAP HANA databases. You can also modify the values of the variables to suit your monitoring requirements.

For information on types of parameters, see "Types of Parameters " below.

Types of Parameters

The parameters are grouped as follows:

- **Instance Parameters** - These parameters are essential for monitoring SAP HANA databases. For example, JDBC Url to connect with HANA system is an Instance Parameter.
- **Mandatory Parameters** - These parameters contain the essential information required by policy templates. For example, User Name to connect to the HANA system is a mandatory parameter.
- **Dependent Parameters** - There are some parameters which are a subset of the mandatory parameters. Such parameters are referred to as dependent parameters. For example, Java Installation Directory is a dependent parameter of JDBC Url to connect with HANA system is an Instance Parameter.
- **Expert Parameters** - These parameters can be used by SMEs and Administrators.

HANA Parameters

OMi MP for SAP HANA contains the following parameters:

Parameter	Parameter Type	Description	Default Values
SAP HANA Database SID		SAP HANA Database SID	
SystemDB's JDBC URL	Mandatory	JDBC URL to connect to the HANA system database	
TenantDB's JDBC URL	Mandatory	JDBC URL to connect	

Parameter	Parameter Type	Description	Default Values
		to the HANA tenant database	
User Name to connect to the HANA system/tenant	Mandatory	User name to connect to the HANA system/tenant database	
Password to connect to the HANA system/tenant	Mandatory	Password to connect to the HANA system/tenant database	
High Availability Setup		The system is in high availability set up or not	False
JAVA installation directory		If JAVA is not available in the system path, the JAVA installation directory needs to be updated with JAVA_HOME.	
Encrypt		Enable or Disable SSL encryption	False
Validate Certificate		Validate server certificate	False
Hostname in Certificate		Host name to verify server identity	
KeyStore		Location of the Java key store	
KeyStore Type		Java keystore file format	
KeyStore Password		Password to access the private key from the keystore file	
TrustStore		Path to trust store file that contains the server public certificates	
TrustStore Type		File format of trust store file	
TrustStore Password		Password to access	

Parameter	Parameter Type	Description	Default Values
		the trust store file	
Frequency for running SystemDB Discovery(Hours)		Frequency at which the system database discovery policy should run	
Frequency for running TenantDB Discovery(Hours)		Frequency at which the tenant database discovery policy should run	

Tuning Parameters

You can edit the parameters of the HANA Management Templates that are already deployed to the CIs. To edit the parameters, follow these steps:

1. Open the Assignments & Tuning pane:

   On OMi 10.x, click **Administration > Monitoring > Assignments & Tuning**.

2. In the **Browse Views** tab, select the **HANA_Deployment** view that contains the CI for which you want to tune parameters. Alternatively, you can use the **Search** tab to find a CI.

3. In the list of CIs, click a **CI**. The Assignments pane shows details of any existing assignments for the CI.

4. Click the assignment for which you want to tune parameters. The Assignment Details pane shows the current parameter values.

5. In the Assignment Details pane, change the parameters:

   a. *(Optional).* By default, the list shows only mandatory parameters. To see all parameters, click  .

   b. Select a parameter in the list, and then click  **Edit**.

   - For standard parameters, the Edit Parameter dialog box opens.

     Click **Value**, specify the value, and then click **OK**.

   - For instance parameters, the Edit Instance Parameter dialog box opens.

Change the instance values if necessary, and then for each instance value, change dependent parameter values. After you change the instances and dependent parameter values, click **OK**.

6. In the Assignment Details pane, click **Save Changes**.

   Operations Management deploys the new parameter values to the relevant HP Operation Agents.

Configuration Items and Configuration Item Types

Configuration Items (CIs) are components that have to be managed to deliver an IT Service. CIs typically include IT services, hardware, and software.

Configuration Item Types (CITs) describes the type of a CI and its attributes. The SAP HANA CIs that are discovered in an environment are grouped under the CITs. OMi MP for SAP HANA comprises the following CITs:

- HanaDatabase
- HanaInstance

Run-time Service Model (RTSM) Views

An RTSM View enables you to build and visualize a subset of the overall CI model that comprises CITs related to SAP HANA databases. Using the Views, you can visualize the topology of a SAP HANA environment. In addition, Views can be used to do the following:

- Manage the Event Perspective of SAP HANA CIs
- Manage the Health Perspective of SAP HANA CIs
- Assigning and Tuning the Management Templates, Aspects, and Policy Templates

How to Access the RTSM Views

1. Open the RTSM Views:

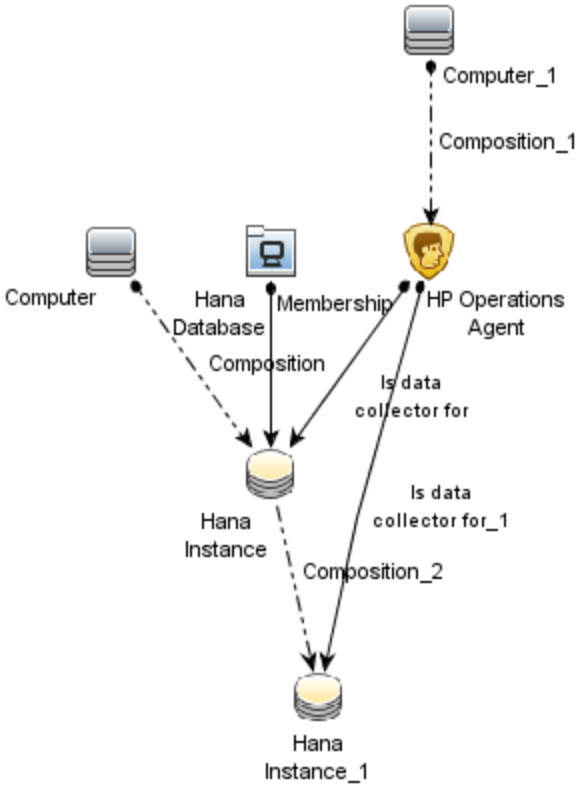
   On OMi 10.x, click **Administration > RTSM Administration > Modeling > Modeling Studio > Resources**.

2. Click **Resource Type** as **Views**.
3. Click **Operations Management > Databases** from the list.

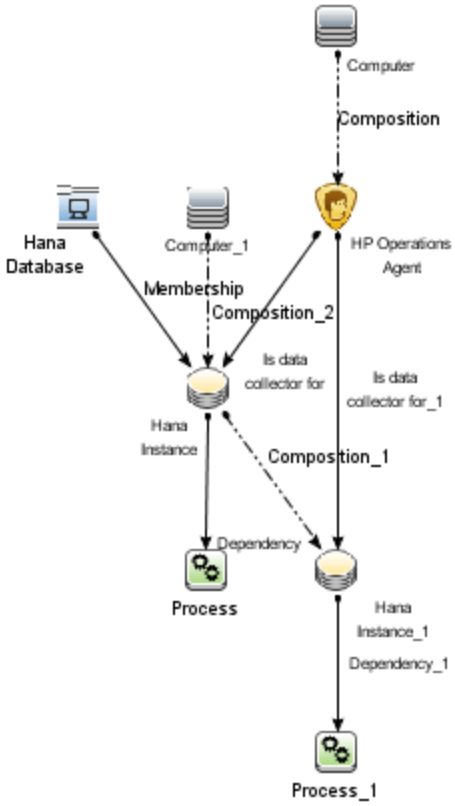
   You can see the Views for OMi MP for SAP HANA.

By default OMi MP for SAP HANA includes the following Views:

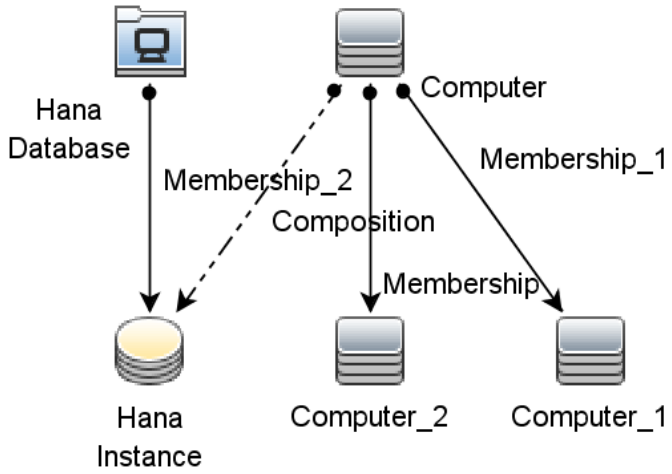
- **HANA_Deployment:** This RTSM View provides information about the SAP HANA database topology which includes the components - HanaDatabase and HanaInstance.



- **HANA_Topology:** This RTSM View provides detailed information about SAP HANA system and the database processes.



- **HANA_HA:** This RTSM View provides detailed monitoring information about high availability, its primary and secondary nodes.



Health Indicators (HIs)

HIs analyze the events that occur in SAP HANA CIs and report the health of the SAP HANA CIs. The OMi MP for SAP HANA includes the following HIs to monitor the SAP HANA-related events:

To access

Select **Admin > Operations Management > Monitoring > Indicators > <Select respective CI Type>**

CI Type	HI	Description	Value/Severity
hana_ instance	SAP HANA Index Server Heap Memory Usage	Indicates heap memory usage by Index server	Normal/NORMAL, High/MAJOR
hana_ instance	SAP HANA Preprocessor Status	Indicates preprocessor service status	Up/NORMAL, Down/CRITICAL
hana_ instance	SAP HANA Non Partitioned Table Record Status	Indicates high number of records in row table	Normal/NORMAL, High/MINOR
hana_db	SAP HANA Disk Usage	Indicates space usage on each disk. This includes space used by non-SAP HANA files.	Normal/NORMAL, High/MINOR, NearCapacity/MAJOR
hana_ instance	SAP HANA Indexserver Status	Indicates index service status	Up/NORMAL, Down/CRITICAL
hana_ instance	SAP HANA Service CPU Memory Usage	Indicates CPU Usage of HANA Services	Normal/NORMAL, High/MINOR
hana_ instance	SAP HANA Compileserver Status	Indicates compileserver status	Up/NORMAL, Down/CRITICAL
hana_ instance	SAP HANA Statisticsserver Status	Indicates statistics service status	Up/NORMAL, Down/CRITICAL
hana_ instance	SAP HANA Database Connection Status	Indicates database connectivity status	Success/NORMAL, NearCapacity/MAJOR, ConnectionFailure/CRITICAL

CI Type	HI	Description	Value/Severity
hana_ instance	SAP HANA Nameserver Status	Indicates nameserver status	Up/NORMAL, Down/CRITICAL
hana_ instance	SAP HANA Delta Memory Usage	Indicates high memory size of the delta storage of column tables	Normal/NORMAL, High/MINOR
hana_ instance	SAP HANA Physical Memory Usage	Indicates physical memory usage on the host. This includes non-SAP HANA processes	Normal/NORMAL, High/MINOR
hana_ instance	SAP HANA Column Table Record Status	Indicates high number of records in non-partitioned column tables	Normal/NORMAL, High/MINOR
hana_ instance	SAP HANA Log Backup Status	Indicates log backup status	Success/NORMAL, Failure/MAJOR
hana_ instance	SAP HANA Daemon Status	Indicates daemon service status	Up/NORMAL, Down/CRITICAL
hana_ instance	SAP HANA Shared Memory Usage	Indicates shared memory usage of a service on a host	Normal/NORMAL, High/MINOR
hana_ instance	SAP HANA Database Service Status	Indicates HANA services status	Up/NORMAL, Down/MINOR
hana_ instance	SAP HANA Data Backup Status	Indicates data backup status	Success/NORMAL, Failure/MAJOR

Tools

The OMi MP for SAP HANA is packaged with tools which enable administering and monitoring the SAP HANA CIs.

How to Access Tools

1. Open the Tools pane:

   On OMi 10.x, click **Administration > Operations Console > Tools**.

2. In the CI Types pane, click **ConfigurationItem > InfrastructureElement > RunningSoftware > Database > HanaDatabase**.

It comprises the following tools:

CI Type	Tool Name	Description
host_node	Remove HANA DataSource	Deletes the existing Data Source and all the collected data will be lost
	Stop HANA Monitoring	Stops HANA monitoring on the managed node
	Restart HANA Monitoring	Restarts HANA monitoring on the managed node

Performance Dashboard

Note: The Performance Dashboard is supported from OMi version 10.12 onwards.

Performance Dashboards represent a pictorial representation of metrics. The OMi MP for SAP HANA includes the performance dashboard. The graphs are generated from the **HANA_DATA** data source. For information about creating and viewing graphs, see the documents for Performance Dashboard available in documentation for the Operations Manager i.

View Performance Dashboard

Performance Perspective enables you to populate graphs from existing graph templates. You can also plot customized graphs by selecting the required metrics for a selected CI.

To view the Performance Perspective of the type **hana_instance** using dashboard, follow these steps:

1. Open the Performance Perspective pane:

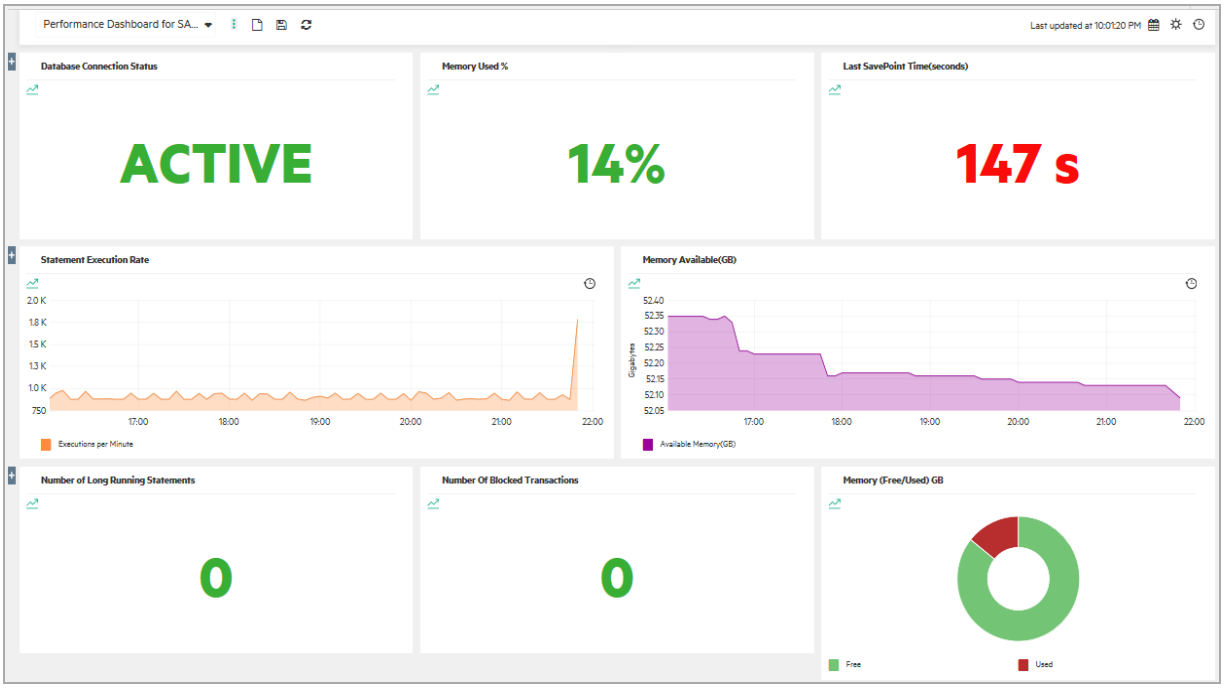
   Click **Workspaces > Operations Console > Performance Perspective**.

   The View Explorer pane appears.

2. In the **Browse Views** tab, select the **HANA_Deployment** or **HANA_Topology** view.

   The Performance Dashboard for SAP appears in the Performance pane.

The following is an example of **Performance Dashboard for SAP HANA**:



List of Performance Dashboard

Datasource	Performance Dashboard
Operations Agent	Performance Dashboard for SAP HANA

Types of Performance Dashboard

Performance Dashboard	Graphs	Metrics
Performance Dashboard for SAP HANA	Database Connection Status	HANACNNSTS
	Memory Used %	HANAUSEDPHY_ MEMPCT
	Last SavePoint Time	HANALSTSVPNTTIME

Performance Dashboard	Graphs	Metrics
	(seconds)	
	Statement Execution Rate	HANAEXECCNT
	Memory Available (GB)	HANAFREEPHY_MEMGB
	Number of Long Running Statements	HANALNGRNGSTMTCNT
	Number Of Blocked Transactions	HANABLCKTRANSCNT
	Memory (Free/Used) GB	HANAFREEPHY_MEMGB HANAUSEDPHY_ MEMGB

Monitoring for SAP HANA High Availability

The following describes the high availability scenarios:

1. **Scenario 1**

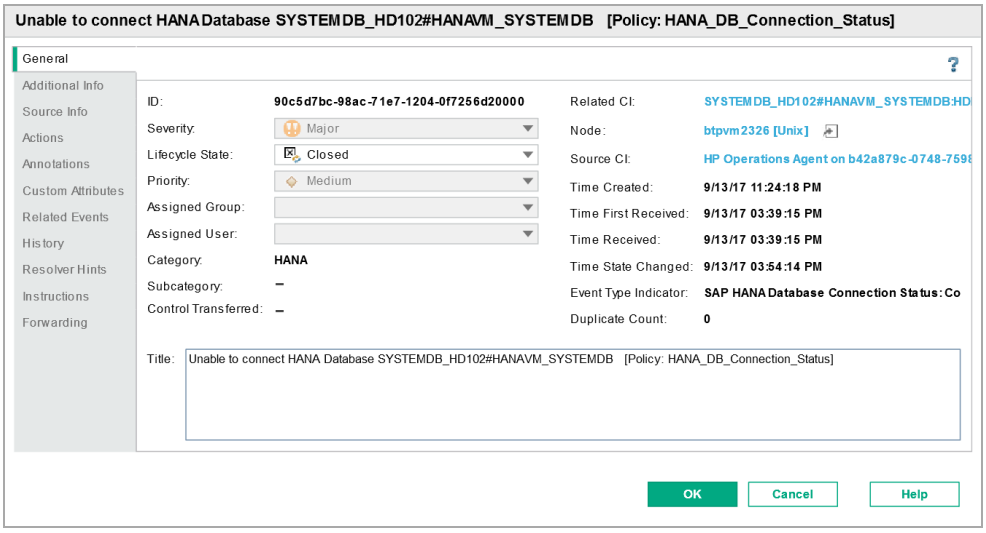
   In this scenario, the primary node crashes and the secondary node takes over only if it is specified explicitly. Otherwise, the secondary node continues to work as a standalone HANA system.

   Secondary node will not have any synchronization configured and hence there will be no data in M_SERVICE_REPLICATION table.

   Expected behavior

   - **Discovery**: HANA_Topology view will not have any impact. When the secondary node becomes primary node, HANA_HA view will be empty till the next scheduled discovery happens. This is because the database is standalone and not configured for system replication.
   - **Monitoring**:

     i. When the primary node goes down and till the secondary node takes over, an event is generated and sent to the OMi.



     ii. When the secondary node becomes primary, the above event gets acknowledged in the Event Browser of the OMi. The monitoring of the new primary node begins.

     iii. Since there is only one node in the scenario with no system replication, the System Replication Status (SRS) is not monitored.

2. **Scenario 2**

   In this scenario, the primary node crashes and the secondary node takes over. After a few days/weeks when the primary node is up and running again, a sync is performed between primary and secondary nodes.

   Now, secondary node can become primary and primary node can become secondary. In this case, there will be data in M_SERVICE_REPLICATION table with the roles of the nodes reversed.

   Expected behavior

   The behavior is similar to **Scenario 1** till the secondary node is configured.

   Once the secondary node is configured, there is no impact on discovery and monitoring. The System Replication Status is monitored.

3. **Scenario 3**

   In this scenario, the primary node crashes and the secondary node takes over. After a few minutes, when the primary node is up and running again, a sync is performed between the primary and secondary nodes.

   In this scenario, the initial primary node can become primary again. In this case, there will be data in M_SERVICE_REPLICATION table with the roles of nodes remaining intact.

   Expected behavior

   - **Discovery**: No Impact.
   - **Monitoring**:
     i. The **HANA_DB_Connection_Status** policy sends an event to OMi stating that the primary node is down.
     ii. Monitoring of primary node resumes after sometime, say 15 minutes.
     iii. The event generated in this scenario is acknowledged.

4. **Scenario 4**

   In this scenario, both primary and secondary are up and running but the system replication breaks.

   No change in the deployment scenario.

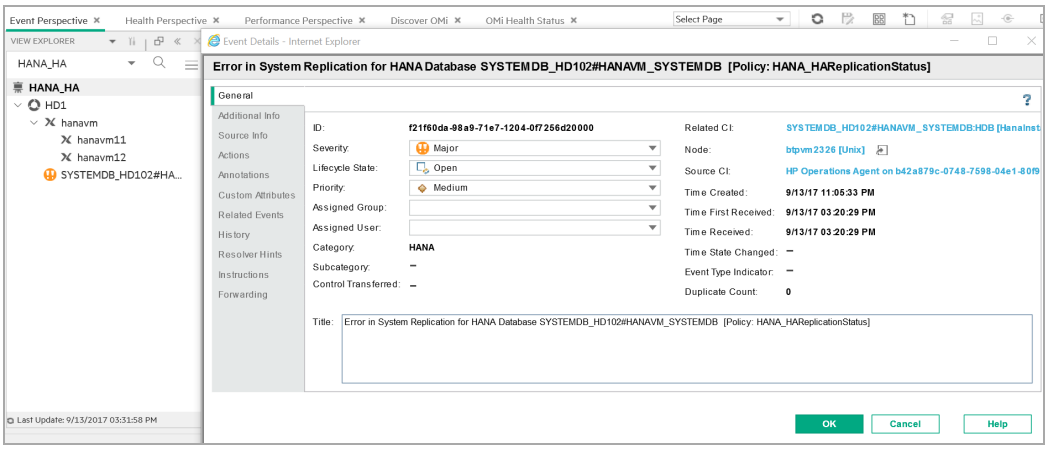
   Expected behavior.

   - **Discovery**: The HANA_Topology and HANA_HA views will remain same.
   - **Monitoring**:

i. Data collection and monitoring happens using virtual JDBC URL.

ii. The Service Replication Status is monitored. Based on the replication status, the **HANA_HAReplicationStatus** policy sends events to the OMi.

Replication Status	Events
NOT ACTIVE	MINOR
ERROR	MAJOR



iii. When the System Replication Service becomes active, the major or minor event is acknowledged on the OMi.

Before You Begin

Before you begin the set up for high availability, ensure the following:

1. Create a management pack user with required user privileges. For more information on user privileges, see "User Privilege" on page 18.

> **Note:** Ensure to use the same user for both primary and secondary servers with same password for all the database instances to be discovered and monitored (including System & Tenant).

Configure Monitoring for SAP HANA HA System

To configure monitoring for SAP HANA HA system, follow these steps:

Task 1: Deploy HANA System DB Service Discovery Aspect

1. Open the Management Templates & Aspects pane:

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane:

   Configuration Folders > Database Management > SAP HANA > Aspects

3. In the HANA Aspects folder, click the **HANA System DB Service Discovery** that you want to deploy, and then click  . The Assign and Deploy wizard opens.

4. In the **Configuration Item** tab, click the remote managed node CI and then click **Next** to go to **Required Parameters**.

5. In the **Required Parameters** tab, you must specify the mandatory parameters.

Parameter Name	Description
SystemDB's JDBC URL	Provide virtual host JDBC URL (which is pointing to primary Server) for system DB. For example, `jdbc:sap://hanavm.testlab.net;15.114.163.21?databaseName=SYSTEMDB&instanceNumber=02&reconnect=true&timeout=0` **Note:** The **hanavm.testlab.net** is the virtual hostname configured for HA setup and **15.114.163.21** is the virtual IP configured for HA Setup.

6. In the **Parameter Summary** tab,

   a. The **SystemDB's JDBC URL** and **Frequency for running SystemDB Discovery(Hours)** are the parameters available in this tab. Select the parameter you want to edit and click  **Edit**. The Edit parameter window appears.

   b. In the **Instance Values** pane, double click the parameter and edit the value.

   c. In the **Dependent Values** pane, click the parameter you want to edit. The Edit Parameter window is displayed.

   > **Note:** Ensure to set the value for **High Availability Setup** parameter as **true**.

   d. Enter the value and click **OK**.

   e. Click **OK** again and then click **Next**.

7. *(Optional)* In **Parameter Summary** tab on OMi 10.x, click **Next** to go to the **Configure Options** tab.

If you do not want to enable the assignment immediately, clear the or Enable Assignment(s) check box.

You can enable the assignment later using the Assignments & Tuning pane.

8. Click **Finish**.

Task 2: Deploy HANA Tenant DB Service Discovery Aspect

1. Open the Management Templates & Aspects pane:

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane:

   Configuration Folders > Database Management > SAP HANA > Aspects

3. In the HANA Aspects folder, click the **HANA Tenant DB Service Discovery** that you want to deploy, and then click  . The Assign and Deploy wizard opens.

4. In the **Configuration Item** tab, click the remote managed node CI and then click **Next** to go to **Required Parameters**.

5. In the **Required Parameters** tab, you must specify the mandatory parameters.

Parameter Name	Description
TenantDB's JDBC URL	Provide virtual host JDBC url(which is pointing to primary Server) for Tenant DB. For example, `jdbc:sap:// hanavm.testlab.net;15.114.163.21?databaseName=TENANTDB&instanceNumber=02&reconnect=true&timeout=0` **Note:** Here, **hanavm.testlab.net** is the virtual hostname configured for HA setup and **15.114.163.21** is the virtual IP configured for HA Setup.

6. In the **Parameter Summary** tab,

   a. The **TenantDB's JDBC URL** and **Frequency for running TenantDB Discovery(Hours)** are the parameters available in this tab. Select the parameter you want to edit and click  **Edit**. The Edit parameter window appears.

   b. In the **Instance Values** pane, double click the parameter and edit the value.

   c. In the **Dependent Values** pane, click the parameter you want to edit. The Edit Parameter window is displayed.

   Note: Ensure to set the value for **High Availability Setup** parameter as **true**.

d. Enter the value and click **OK**.

e. Click **OK** again and then click **Next**.

7. *(Optional)* In **Parameter Summary** tab on OMi 10.x, click **Next** to go to the **Configure Options** tab.

   If you do not want to enable the assignment immediately, clear the or Enable Assignment(s) check box.

   You can enable the assignment later using the Assignments & Tuning pane.

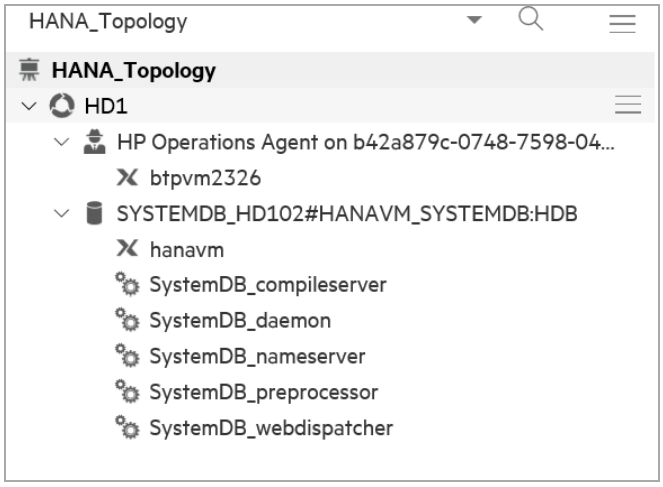
8. Click **Finish**.

Task 3: Verify Topology Views

After deploying the discovery aspects, you can view the discovery topology in the Event Perspective. Select the topology view.

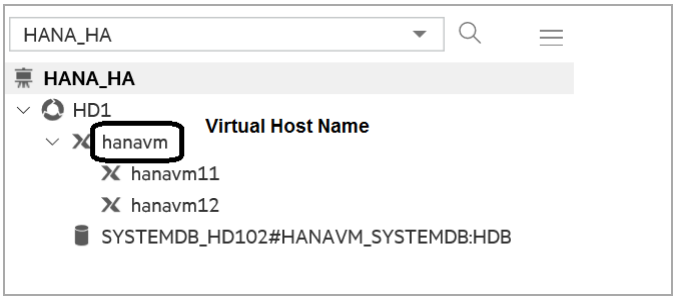
The following are the topology views:

1. **HANA_Topology**: Represents the topology of the primary node that is discovered using virtual hostname (JDBC URL) and shows the relationship of SAP HANA CI instances with virtual hostname.



2. **HANA_HA**: Represents the topology of high availability components – virtual host and

primary/secondary nodes of the HA Setup.



Task 4: Deploying the HANA Management Templates or HANA Aspects

You can deploy other required management templates and aspects. See "Task 4: Deploying the HANA Management Templates or HANA Aspects" on page 18.

Task 5: Deploy HANA High Availability Monitoring Aspect

Deploy the HANA High Availability Monitoring aspect to monitor the System Replication Status (SRS).

> **Note:** You can only monitor the primary node.

1. Open the Management Templates & Aspects pane:

   On OMi 10.x, click **Administration > Monitoring > Management Templates & Aspects**.

2. In the Configuration Folders pane:

   Configuration Folders > Database Management > SAP HANA > Aspects

3. In the HANA Aspects folder, click the **HANA High Availability Monitoring** that you want to deploy, and then click . The Assign and Deploy wizard opens.

4. In the **Configuration Item** tab, click the remote managed node CI and then click **Next** to go to **Required Parameters**.

5. In the **Required Parameters** tab, you can update the SAP HANA database SID.

6. *(Optional)* In **Parameter Summary** tab on OMi 10.x, click **Next** to go to the **Configure Options** tab.

   If you do not want to enable the assignment immediately, clear the or Enable Assignment(s) check box.

   You can enable the assignment later using the Assignments & Tuning pane.

7. Click **Finish**.

Chapter 5: Troubleshooting

The following section provides information about tools, errors, warnings, and corrective actions related to troubleshooting OMi MP for SAP HANA.

Log Files

The following table provide information about the log file locations and changing the trace levels for troubleshooting:

Feature	Log File Location	Trace Level
Discovery Connectivity Metric License Count	<ovdatadir>/log/HANA/HanaMP.log <ovdatadir>/log/HANA/HanaCollection_Script.log	1. Open < ovdatadir>/tmp/HANA/hanalog4j.properties 2. To change the trace level, update the attribute log4j.appender.FILE.Threshold The new trace level will be applicable during the next run of Discovery Aspect.
Collector or Eventing or DataLogging	<ovdatadir>/log/HANA/HanaCollection.log <ovdatadir>/log/HANA/HanaCollection_Script.log	1. Open <ovdatadir>/conf/HANA/jdbc/HANA_Config.collConfig 2. To change the trace level, update the attribute log4j.level. The new trace level will be applicable automatically.
Scheduling Script	<ovdatadir>/log/HANA/collectionManager/collection_schedule.log	N/A
Collection Framework	<ovdatadir>/log/HANA/collectionManager/CollectionManager.log	1. Open <ovdatadir>/tmp/HANA/collectionManager/HANAcmlog4j.properties 2. To change the trace level, update the attribute log4j.appender.FILE.Threshold

Data Collection

The following section provides information for troubleshooting data collection related issues:

Problem: Data is not collected even after deploying the policies.

> **Note:** You can run the following command and check if data is getting collected or not:
>
> `ovcodautil -dumpds HANA_DATA`

Solution: Run the **Restart HANA Monitoring** tool.

> **Note:** For all the issues related to collection, you can check the log file at the location `<ovdatadir>/log/HANA/HanaCollection_Script.log`

Problem: No events are seen on the OMi even though the limit exceeds the thresholds defined in the policy.

Solution: See solution for **Data missing in the graphs of the performance dashboard** problem in Performance Dashboard and follow from Step 2.

Discovery

The following table provides information about the errors and corrective action related to Discovery:

Error Code	Error Message	Error Cause	Alert	Corrective Action
HN-07004	`[ERROR] : [HN-07004] Compiling <Datasource Class Name> for data source HANA_DATA`	This error message appears when a specific class cannot be created. This error occurs only during the first deployment.	No Alert	Get detailed log and contact support

Error Code	Error Message	Error Cause	Alert	Corrective Action
HN-04001	[ERROR] [HN-04001] <ovdatadir>/bin/instrumentation/hanalog4j.properties not found!	This error message occurs when changes are made to the Instrumentation folder.	No Alert	Run the Stop HANA Monitoring tool to stop the collector. Redeploy Discovery Aspect.
HN-01001	[ERROR] [HN-01001] In reading <ovdatadir>/bin/instrumentation/hanalog4j.properties <Error Message	This error message occurs when changes are made to the Instrumentation folder.	No Alert	Run the Stop HANA Monitoring tool to stop the collector. Redeploy Discovery Aspect.
HN-07005	[HN-07005] Error in creating service xml/config file. Failed with message: <Error Messsage>. Exiting discovery because of the exception or [HN-07005] Failed to run discovery commands for instance: "+< hana_instance> + <Error Message>"	This error message appears when OMi MP for SAP HANA fails to discover the HANA databases.	Alert	Get detailed log and contact support
HN-04004	[ERROR] [HN-04004] <OvDataDir>/tmp/HANA/SrvcDiscHana.xml not available		No Alert	Redeploy the Discovery Aspect. Get detailed log and contact support

Error Code	Error Message	Error Cause	Alert	Corrective Action
[HN-07010] Error in JDBC connectivity. Failed with message:	`[ERROR] - [10]: authentication failed`	This error message appears if either username or password is entered wrong		Ensure that the username and password are correct.
[HN-07010] Error in JDBC connectivity. Failed with message:	`[ERROR] - SAP DBTech JDBC: Cannot connect to jdbc:sap://JDBC_url; [None of the hosts could be reached]`	This error message appears if database is down or the JDBC URL is wrong.		Ensure that the database is up and running and also the JDBC URL is correct.

Note: For all the issues related to discovery, you can check the log file at the location `<ovdatadir>/log/HANA/HanaMP.log`.

Licensing

The following table provides information about the errors and corrective actions related to Licensing:

Error Code	Error Message	Error Cause	Alert	Corrective Action
HN-08003	`[ERROR] [HN-08003] Could not count MP license. HANA conf directory and HANAcmadvconfig.properties path should be passed`	This error message occurs when changes are made to the Instrumentation	No Alert	Run the Stop HANA Monitoring to stop the collector. Redeploy Discovery Aspect.

Error Code	Error Message	Error Cause	Alert	Corrective Action
		folder.		
HN-04001	"[ERROR] [HN-04001] <ovdatadir>/bin/instrumentation/hanalog4j.properties not found!. <Error Message>	This error message occurs when changes are made to the Instrumentation folder.	No Alert	
HN-01001	[ERROR] [HN-01001] In reading <ovdatadir>/bin/instrumentation/hanalog4j.properties <Error Message>		No Alert	
HN-04002	[HN-04002] Could count MP license. File <OvDataDir>/conf/HANA/jdbc/HANA_Config.txt does not exists	This error message appears when Discovery fails.	No Alert	
HN-04003	[HN-04003] Could count MP license. File <ovdatadir>/bin/instrumentation/HANAcmconfiguration.properties does not exists	This error message occurs when changes are made to the Instrumentation folder.	No Alert	
HN-01002	[HN-01002] Cannot try for jdbc connectivity. File <ovdatadir>/bin/instrumentation/HANAcmconfiguration.properties could not be read	This error message occurs when changes are made to the Instrumen	No Alert	

Error Code	Error Message	Error Cause	Alert	Corrective Action
		tation folder.		
HN-01003	[HN-01003] File <ovdatadir>/bin/instrumentation/HANAcmconfiguration.properties could not be closed		No Alert	Run the Stop HANA Monitoring to stop the collector.Check all the file handles for HANAcmconfiguration.properties and close the files manually. Redeploy Discovery Aspect.
HN-06003	[HN-06003] Cannot try for jdbc connectivity. Class com.hp.bsm.content.collector.jdbc.ConfigReader not available in class path	This error message occurs when changes are made to the Instrumentation folder.	No Alert	Run the Stop HANA Monitoring to stop the collector. Redeploy Discovery Aspect.
HN-07001	[HN-07001] Cannot try for jdbc connectivity. Error invoking configreader clas	This error message occurs when changes are made to the Instrumentation folder.	No Alert	Get detailed log and contact support.
HN-07003	[HN-07003] MP License count failed for application HANA with instance <HANA SID>	This error message appears when HANA database connection fails or any run	No Alert	Get detailed log and contact support.

Error Code	Error Message	Error Cause	Alert	Corrective Action
		time errors occur in the HANA databases,		

Connectivity Check

The following tables provides information about the errors and corrective actions elated to Connectivity Check:

Error Code	Error Message	Error Cause	Alert	Corrective Action
HN-08002	[ERROR] [HN-08002] Could not check jdbc connectivity. HANA conf directory, policy name and cmadvconfig path only should be passed	This error message occurs when changes are made to the Instrumentation folder.	No Alert	Run the Stop HANA Monitoring to stop the collector. Redeploy Discovery Aspect.
HN-04001	[ERROR] [HN-04001] <ovdatadir>/bin/instrumentation/hanalog4j.properties not found!	This error message occurs when changes are made to the Instrumentation folder.	No Alert	Run the Stop HANA Monitoring to stop the collector. Redeploy Discovery Aspect.

Error Code	Error Message	Error Cause	Alert	Corrective Action
HN-01001	[ERROR] [HN-01001] In reading <ovdatadir>/bin/instrumentation/hanalog4j.properties	This error message occurs when changes are made to the Instrumentation folder.		
HN-04002	[HN-04002] Could not check jdbc connectivity. File <OvDataDir>/conf/HANA/jdbc/HANA_Config.txt does not exists	This error message occurs when Discovery fails.	No Alert	Run the Stop HANA Monitoring to stop the collector. Redeploy Discovery Aspect.
HN-04003	[HN-04003] Could not check jdbc connectivity. File <ovdatadir>/bin/instrumentation/HANAcmconfiguration.properties does not exists	This error message occurs when changes are made to the Instrumentation folder.	No Alert	Run the Stop HANA Monitoring to stop the collector. Redeploy Discovery Aspect.
HN-01002	[HN-01002] Cannot try for jdbc connectivity. File <ovdatadir>/bin/instrumentation/HANAcmconfiguration.properties could not be read	This error message occurs when changes are made to the Instrumentation folder.	No Alert	Run the Stop HANA Monitoring to stop the collector. Redeploy Discovery Aspect.
HN-01003	[HN-01003] File <ovdatadir>/bin/instrumentation/HANAcmconfiguration.properties could not be closed		No Alert	Run the Stop HANA Monitoring to stop the collector.Check all the file handles for HANAcmconfiguration

Error Code	Error Message	Error Cause	Alert	Corrective Action
				`.properties` and close the files manually. Redeploy Discovery Aspect.
HN-06003	`[HN-06003] Cannot try for jdbc connectivity. Class com.hp.bsm.content.collector.jdbc.ConfigReader not availabe in class path`	This error message occurs when changes are made to the Instrumentation folder.	No Alert	Run the Stop HANA Monitoring to stop the collector. Redeploy Discovery Aspect.
HN-07001	`[HN-07001] Cannot try for jdbc connectivity. Error invoking configreader class`	This error message occurs when changes are made to the Instrumentation folder.	No Alert	
HN-09001	`[HN-09001] JDBC connectivity not available for appplication HANA with instance <HANA SID>`	This error message occurs when user credentials are changed.	No Alert	Get detailed log and contact support
HN-09002	`[HN-09002] Could not check jdbc connectivity for appplication HANA with instance <HANA SID>`	This error message occurs when any run time exceptions or errors occur in HANA	Alert	Get detailed log and contact support

Error Code	Error Message	Error Cause	Alert	Corrective Action
		databases.		
HN-07002	[HN-07002] Error sending connectivity status event for <HANA SID>	This error message appears when opcmon fails during connection.	No Alert	Get detailed log and contact support

Tools

The following tables provide information about tool related errors and warnings:

Restart HANA Monitoring Tool

Errors

Error Code	Error Message	Error Cause	Alert	Corrective Action
HN-02001	[ERROR]: [HN-02001] Failed to create <ovdatadir>/tmp/collectionManager/stopcollector, hence could not restart collector...	Permission Issues	No Alert	Check for user permissions and rerun the tool.
HN-10001	[ERROR]: [HN-10001] Collector for HANA is still running, try again...	Collector process is not responding.	No Alert	Lookup for java process with attribute cmmain_HANA, kill it manually, send the logs to support and run the tool

Error Code	Error Message	Error Cause	Alert	Corrective Action
				again

Warnings

Error Code	Error Message	Error Cause	Alert	Corrective Action
HN-03001	[WARNING] [HN-03001] <ovdatadir>/tmp/collectionManager/stopcollector already exists!!!. Wait for collector to be stopped ...	Remove the cause	No Alert	Wait for few minutes and rerun the tool.
HN-03002	[WARNING] : [HN-03002] <ovdatadir>/tmp/HANA/processeslist.txt exists, should have been deleted during previous run. Remove the file manually if it exists after the current run...		No Alert	Verify if the collector is restarted successfully. Check logfiles for any errors.

Common Errors

Error Code	Error Message	Error Description	Error Cause	Corrective Action
HN-02002	[ERROR] : [HN-02002] Unable to create <OvDataDir>/tmp/HANA	No Alert	This error message appears due to user permission issues and occurs when the Discovery Aspect is deployed for the first time.	Check for user permissions and redeploy Discovery Aspect
HN-02003	[ERROR] : [HN-02003] Unable to create <OvDataDir>/log/HANA	No Alert		
HN-	[ERROR] : [HN-02004] Unable to create	No Alert		

Error Code	Error Message	Error Description	Error Cause	Corrective Action
02004	<OvDataDir>/tmp/HANA/schedules			
HN-02005	[ERROR] : [HN-02005] Unable to create <OvDataDir>/conf/HANA	No Alert		
HN-02006	[ERROR] : [HN-02006] Unable to create <OvDataDir>/conf/HANA/jdbc	No Alert		
HN-02007	[ERROR] : [HN-02007] Unable to copy <OvDataDir>/bin/instrumentation/HANA_Config.collConfig to <OvDataDir>/conf/HANA/jdbc/	No Alert		
HN-02008	[ERROR] : [HN-02008] Unable to create <OvDataDir>/conf/dsi2ddf	No Alert		
HN-02009	[ERROR] : [HN-02009] Unable to create <ovdatadir>/conf/dsi2ddf/nocoda.opt	No Alert		
HN-0200B	[ERROR] : [HN-0200B] Unable to create <ovdatadir>/tmp/collectionManager	No Alert		
HN-0200C	[ERROR] : [HN-0200C] Unable to create <ovdatadir>log/collectionManager	No Alert		
HN-05001	[ERROR] [HN-05001] can't create object of OvParam::Template; $!	No Alert	This error message appears due to run-time errors.	Check prerequisites and System.txt file for detailed messages and contact support
HN-06001	[ERROR] : [HN-06001] java version should be 1.6.* and above; hence collection/discovery will not be started	No Alert	This error message appears when Java version 1.6 or above is not installed.	Install java version 1.6 or above and redeploy Discovery Aspect
HN-06002	[ERROR] : [HN-06002] jdbc jar for HANA (ngdbc.jar) is not available; hence collection/discovery will not be started	No Alert	This error message appears when the jdbc.jar is not available.	Copy the ngdbc.jar to instrumentation folder of Manage node.

Monitoring SAP HANA High Availability

The following section provides information for troubleshooting for monitoring of SAP HANA HA related issues:

Problem: Discovery fails even after the SystemDB Discovery / TenantDB Discovery aspects are deployed on the managed node to discover SAP HANA High Availability system.

The views (HANA_topology, HANA_HA and HANA_deployment) do not show the discovered HANA CI instances.

Solution: Perform the following:

1. Undeploy the SystemDB Discovery/TenantDB Discovery aspects.
2. Deploy the SystemDB Discovery/TenantDB Discovery aspects again.

   > **Note:** Ensure to set the value for **High Availability Setup** parameter as **true**.

   For more information, see "Configure Monitoring for SAP HANA HA System" on page 57.

Problem: Data is not collected for HANA_SR_STATUS class on the managed node and even though the System Replication Status is not active, no event from **HANA_HA_Replication status** policy is sent to the OMi.

Solution: After you deploy the other required management templates and aspects, deploy the **HANA High Availability Monitoring** aspect. For more information, see "Task 5: Deploy HANA High Availability Monitoring Aspect" on page 61.

Upgrade Scenario

The following section provides information for troubleshooting for upgrade related issues:

Problem: Errors encountered during the upgrade.

Solution: The errors may be due to cleanup issues on the node. Therefore, manually clean up the managed node.

To manually clean up the managed node, follow these steps:

1. On the managed node, run the following command:

   ```
   Ovpolicy –disable –all
   ```

2. On the OMi, run **Stop HANA Monitoring** tool to stop the collector.
3. If the tool fails to run from the OMi, run the following command from the managed node from the instrumentation directory (**%ovadatadir%bin\instrumentation**):

   a. Run the command if the HANA 2.0 discovery aspect is not deployed:

      ```
      HANAcoll_perl hana_discovery.pl stopCollector
      ```

   b. Run the command if the HANA 2.0 discovery aspect is deployed:

      ```
      HANAcoll_perl hana_MPCollector.pl stopCollector
      ```

4. If you are unable to delete the policies from OMi system, run the command from the managed node:

   ```
   Ovpolicy –remove –all
   ```

5. On the OMi system, install the OMi MP for SAP HANA version 2.0, if it is not already installed.
6. Deploy the HANA SystemDB Discovery aspect followed byHANA TenantDB Discovery aspect, if Tenants are available.
7. On the OMi system, run the **Remove HANA DataSource** tool to delete the DataSource.
8. Deploy the other required aspects and the management templates to monitor the HANA System.

Performance Dashboard

The following section provides information for troubleshooting performance dashboard related issues:

Problem: Data missing in the graphs of the performance dashboard.

Solution: Perform the following:

1. Verify the version of the OMi. The performance dashboard is supported on OMi 10.12 onwards.

   If the OMi version is already 10.12, go to next step. Else, ensure to upgrade OMi to version 10.12. For more information, see *OMi documentation*.

2. Check if the aspects for monitoring are deployed on the managed node.

   If not, ensure to deploy the policies and aspects for the classes for which collection has to happen.

3. Check collector status on the managed node. To check the collector status, follow these steps:
   a. Run the following command to check the status of the collector:

      ```
      ovc –status hanamp
      ```

   b. If the collector is not in Running status, run the following command:

      ```
      ovc –start hanamp
      ```

4. Check if the datasource is created on the managed node.
   a. To check the creation of datasource, run the following command:

      ```
      ovcodautil –showds
      ```

   b. If the datasource is not create, run the following command to create the datasource:

      ```
      ovc –restart hanamp
      ```

5. Check if metric data is collected on the managed node.
   a. To check the status of metric data collection, run the following command:

      ```
      ovcodautil –dumpds HANA_DATA
      ```

      For example, if data is not collecd for Statements Execution Rate graph, run the command as:

      ```
      ovcodautil –ds HANA_DATA –o HANA_EXEC_CNT -flat
      ```

   b. If the data is not collected in the mertic, enable trace for the Collection Manager and check for errors in the log files at the following locations:

      ```
      %Ovdatadir%/log/HANA/HanaCollection.log
      ```

      ```
      %Ovdatadir%/log/HANA/collectionManager/CollectionManager.log
      ```

Appendix: OMi MP for SAP HANA Metrics

This chapter provides information about the SAP HANA collections, metrics, and data store tables which can be used to configure the data-collection procedure.

HANAHeapMem_UsedPct

Description: HANA indexserver heap memory used in %

Collection interval: VERYHIGH

Policy: HANA_IndxSrvrUsdHeapMemory

Aspect: HANA Database Memory Usage

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0005:Hana_M0007 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 85

Message Text: Heap memory usage of the Index server is <VALUE>% (threshold is <THRESHOLD>%) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : High memory utilization by services.

Potential Impact: Performance.

Suggested Action(s) : This is indicator of the total amount of memory required to operate the SAP HANA database over a long period of time."

HANAPROCESSCPUTIME

Description: HANA TOTAL_CPU_PROCESS_TIME

Collection interval: MEDIUM

Policy: HANA_ServiceCPUUsage

Aspect: HANA Database CPU Usage

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0040.Hana_M0007 / HANA_DATA

Message Category: HANA

Severity / Threshold: Major / 85, Warning / 75

Message Text: Rule1: Percentage of CPU used by HANA Services is <VALUE>% (threshold is <THRESHOLD>) [Policy: <NAME>]

Message Text: Rule2: Percentage of CPU used by HANA Services is <VALUE>% (threshold is <THRESHOLD>) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : High percentage of total Services CPU on the host is used. All processes consuming memory are considered, including non-SAP HANA processes.

Potential Impact: Performance.

Suggested Action(s) : Investigate memory usage. Identify which services are consuming a lot of memory and any underlying performance-related issues, for example, high-load operations in progress, suboptimal SQL processing. Refer SAP HANA Administrative guide for more details."

HANALICMEMUSAGE

Description: HANA licensed mem usage %

Collection interval: HIGH

Policy: HANA_LicensedMemoryUsage

Aspect: HANA License Status

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0014:Hana_M0006 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 90, Warning / 80

Message Text: Rule1: Licensed memory usage is <VALUE>% (Threshold is <THRESHOLD>%) [Policy: <NAME>]

Message Text: Rule2: Licensed memory usage is <VALUE>% (Threshold is <THRESHOLD>%) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : Percentage of licensed memory used is high.

Potential Impact: Compliance.

Suggested Action(s) : Increase the licensed amount of main memory. If you have purchased a license for less than the total amount of physical memory, you need to change the global allocation limit to remain in compliance with the license."

HANA_RCRD_CNT_BLLN

Description: HANA column table record count (billion)

Collection interval: MEDIUM

Policy: HANA_RcrdCountColTblPartition

Aspect: HANA Database Memory Usage

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0002:Hana_M0005 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 2.0, Warning / 1.0

Message Text: Rule1: Record Count of Column Table Partition is <VALUE>billion(threshold is <THRESHOLD>billion) [Policy: <NAME>]

Message Text: Rule2: Record Count of Column Table Partition is <VALUE>billion(threshold is <THRESHOLD>billion) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : High number of records in non-partitioned column tables.

Potential Impact: Performance.

Suggested Action(s) : A non-partitioned table cannot store more than 2,000,000,000 (2 billion) rows. It is possible to overcome this limit by distributing the table across several partitions. Current table size may not be critical. Consider partitioning the table only if the table is expected to grow significantly."

HANACNNSTS

Description: HANA DB Connection status check

Collection interval:

Policy: HANA_DB_Connection_Status

Aspect: HANA Database Availability

CIT:

Alarming / Logging: Alarming

Message Category: HANA

Severity / Threshold: Major / 0.5

Message Text: Unable to connect HANA Database <MSG_OBJECT> [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : Connection failure could be because of invalid username, password, hostname, port, connect string or database name.

Suggested Action(s) : Validate SAP HANA database configuration details and restart the collection"

HANA_DELTA_MEM_MB

Description: HANA delta memory (MB)

Collection interval: MEDIUM

Policy: HANA_DeltaMemorySize

Aspect: HANA Database Memory Usage

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0009:Hana_M0005 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 50, Warning / 20

Message Text: Rule1: Size of Delta Memory is <VALUE>MB(threshold is <THRESHOLD>MB) [Policy: <NAME>]

Message Text: Rule2: Size of Delta Memory is <VALUE>MB(threshold is <THRESHOLD>MB) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : High memory size of the delta storage of column tables.

Potential Impact: Performance.

Suggested Action(s) : It is important that the delta storage of a table does not become excessively large and is regularly merged with the main storage. The delta merge operation is triggered in different ways depending on your system configuration. Investigate the delta merge history to find out when the last delta merge operation was supposed to happen and why it did not. Consider merging the table delta manually."

HANASRSTATUS

Description: HANA Replication Status

Collection interval: MEDIUM

Policy: HANA_HAReplicationStatus

Aspect: HANA High Availability Monitoring

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0041:Hana_M0003 / HANA_DATA

Message Category: HANA

Severity / Threshold: Major / 1.5, Minor / 0.5

Message Text: Rule1: Error in System Replication for HANA Database <OPTION (INSTANCE)> [Policy: <NAME>]

Message Text: Rule2: System Replication Status is not Active for HANA Database <OPTION (INSTANCE)> [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : System Replication may not be configured or there might be some Network issues

Potential Impact: The Secondary System will not be an exact copy of Primary System due to which Disaster Recovery will not be possible.

Suggested Action(s) : Necessary configurations has to be made to make SR status Active and look into the necessary trace files to trouble shoot the cause."

HANA_ALOC_USGE_PCT

Description: HANA allocation usage pct

Collection interval: VERYHIGH

Policy: HANA_ColStoreMemAllocUsage

Aspect: HANA Database Memory Usage

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0012:Hana_M0004 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 75, Warning / 50

Message Text: Rule1: Column Table Size is <VALUE>% (threshold is <THRESHOLD>%) [Policy: <NAME>]

Message Text: Rule2: Column Table Size is <VALUE>% (threshold is <THRESHOLD>%) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : High percentage of the effective memory allocation limit is being consumed by a column table as a whole (that is, the cumulative size of all of a table's columns and internal structures).

Potential Impact: Performance.

Suggested Action(s) : Consider partitioning (or re-partitioning) the table or moving it to another host."

HANA_DELTA_Record_M

Description: HANA delta record count (million)

Collection interval: MEDIUM

Policy: HANA_DeltaMemRecordCount

Aspect: HANA Database Memory Usage

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0009:Hana_M0006 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 5, Warning / 3

Message Text: Rule1: Delta Memory Record Count is <VALUE>Million (threshold is <THRESHOLD>Million) [Policy: <NAME>]

Message Text: Rule2: Delta Memory Record Count is <VALUE>Million (threshold is <THRESHOLD>Million) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : High number of records in the delta storage of column tables.

Potential Impact: Performance.

Suggested Action(s) : It is important that the delta storage of a table does not become excessively large and is regularly merged with the main storage. The delta merge operation is triggered in different ways depending on your system configuration. Investigate the delta merge history to find out when the last delta merge operation was supposed to happen and why it did not. Consider merging the table delta manually."

HANA Alerts

> **Description**: Policy to collect HANA alerts
>
> **Collection interval**: LOW
>
> **Policy**: HANA_Collect_Alerts
>
> **Aspect**: Hana Database Alerts
>
> **CIT**:
>
> **Alarming / Logging**: Logging
>
> **Data source/ Data class**: HANA_C0016:Hana_M0009 / NA

HANADATABKSTATUS

Description: HANA last complete data back up status

Collection interval: HIGH

Policy: HANA_CompleteDataBackupStatus

Aspect: HANA Backup Status

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0003:Hana_M0004 / HANA_DATA

Message Category: HANA

Severity / Threshold: Major / 2.5, Minor / 1.5, Warning / 0.5

Message Text: Rule1: Last complete data backup failed [Policy: <NAME>]

Message Text: Rule2: Last complete data backup is pending cancellation [Policy: <NAME>]

Message Text: Rule3: Last complete data backup cancelled [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : Last backup may not be successful.

Potential Impact: Data loss in case of failure.

Suggested Action(s) : View the backup catalog, which provides information about the execution and history of data and log backups. To diagnose backup errors, refer to the files backup.log and backint.log files."

HANAUNCMTRANSCNT

Description: HANA uncommitedtransactcount

Collection interval: LOW

Policy: HANA_UncommitedTransactCount

Aspect: HANA Work Load

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0019:Hana_M0003 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 1

Message Text: Number of uncommited transactions is <VALUE> (Threshold is <THRESHOLD>) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : There are uncommitted transactions.

Potential Impact: Such transactions can impact the performance of the database.

Suggested Action(s) : Close the uncommitted transaction in the application or kill the connection by executing the following SQL statement: ALTER SYSTEM DISCONNECT SESSION <LOGICAL_CONNECTION_ID>. For more information, see the table HOST_ LONG_UNCOMMITTED_WRITE_TRANSACTION (_SYS_STATISTICS)."

HANALNGTRANSCNT

Description: HANA longtransactcount

Collection interval: LOW

Policy: HANA_LongTransactCount

Aspect: HANA Work Load

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0021:Hana_M0003 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 1

Message Text: Number of long transactions is <VALUE> (Threshold is <THRESHOLD>) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : There are long-running serializable transactions

Potential Impact: Performance

Suggested Action(s) : Close the serializable transaction in the application or kill the connection by executing the following SQL statement: ALTER SYSTEM DISCONNECT SESSION <LOGICAL_CONNECTION_ID>. For more information, see the table HOST_LONG_ SERIALIZABLE_TRANSACTION (_SYS_STATISTICS)."

HANALNGRNGSTMTCNT

Description: HANA long runnin stmnt count

Collection interval: HIGH

Policy: HANA_LongRunninStmnt

Aspect: HANA Work Load

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0027:Hana_M0003 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 1

Message Text: Number of long running statements is <VALUE> (Threshold is <THRESHOLD>) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : There are SQL statements that have been running for a long time.

Potential Impact: Performance.

Suggested Action(s) : The table HOST_LONG_RUNNING_STATEMENTS (_SYS_ STATISTICS) or annotation text with this alert provides you with more detailed information about individual statements."

HANASERVICESTATUS

Description: HANA service status

Collection interval: VERYHIGH

Policy: HANA_SerivcesStatus

Aspect: HANA Database Availability

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0007:Hana_M0005 / HANA_DATA

Message Category: HANA

Severity / Threshold: Major / 0.5

Message Text: HANA service (<OPTION(HANASERVICE)>) is down [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : One or more services are not started.

Potential Impact: The system is not operational and can be accessed in diagnosis mode only.

Suggested Action(s) : Restart the services manually using system privilege SERVICE ADMIN. Refer SAP HANA Administrative guide for more details."

HANA_USED_PCT

Description: HANA used pct

Collection interval: MEDIUM

Policy: HANA_DiskUsage

Aspect: HANA Database Space Usage

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0010:Hana_M0010 / Correc

Message Category: HANA

Severity / Threshold: Major / 80, Minor / 70, Warning / 60

Message Text: Rule1: Disk Usage is <VALUE>% (threshold is <THRESHOLD>%) [Policy: <NAME>]

Message Text: Rule2: Disk Usage is <VALUE>% (threshold is <THRESHOLD>%) [Policy: <NAME>]

Message Text: Rule3: Disk Usage is <VALUE>% (threshold is <THRESHOLD>%) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : High percentage of space on each disk containing data, log, backup files, and trace files is currently used. This includes space used by non-SAP HANA files.

Potential Impact: Performance.

Suggested Action(s) : To ensure that the database can always be restored to its most recent committed state and to avoid a disk-full event, there must always be enough space on disk for data and log files. Investigate disk space usage. Determine which services are consuming a lot of disk space. See if space can be freed up, for example, through volume shrinkage, log file deletion. If necessary add additional disk space."

HANADATABKPAGE

Description: HANA last complete data backup in days

Collection interval: HIGH

Policy: HANA_CompleteDataBackupAge

Aspect: HANA Backup Status

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0013:Hana_M0004 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 2, Warning / 1

Message Text: Rule1: Last successful complete data backup is <VALUE> day(s) old (Threshold is <THRESHOLD> day(s)) [Policy: <NAME>]

Message Text: Rule2: Last successful complete data backup is <VALUE> day(s) old (Threshold is <THRESHOLD> day(s)) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : Last backup may not be successful.

Potential Impact: Data loss in case of failure.

Suggested Action(s) : View the backup catalog, which provides information about the execution and history of data and log backups. To diagnose backup errors, refer to the files backup.log and backint.log files."

HANALNGIDLECURCNT

Description: HANA longidlecursorcount

Collection interval: LOW

Policy: HANA_LongIdleCursor

Aspect: HANA Work Load

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0025:Hana_M0003 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 1

Message Text: Number of idle cursors is <VALUE> (Threshold is <THRESHOLD>) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : Cursors have been open for more than the specified threshold values.

Potential Impact: Performance.

Suggested Action(s) : Close the cursor in the application, or kill the connection by executing the SQL statement ALTER SYSTEM DISCONNECT SESSION <LOGICAL_CONNECTION_ ID>. For more information, see the table HOST_LONG_IDLE_CURSOR (_SYS_ STATISTICS)."

HANAUsedPhy_MemPct

Description: HANA Used Physical Memory (%)

Collection interval: MEDIUM

Policy: HANA_MemTotalUsage

Aspect: HANA Database Space Usage

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0006:Hana_M0004 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 90, Warning / 80

Message Text: Rule1: Used Physical Memory is <VALUE>% (threshold is <THRESHOLD>%) [Policy: <NAME>]

Message Text: Rule2: Free Physical Memory is <VALUE>% (threshold is <THRESHOLD>%) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : High percentage of total physical memory available on the host is used. All processes consuming memory are considered, including non-SAP HANA processes.

Potential Impact: Performance.

Suggested Action(s) : Investigate memory usage. Identify which services are consuming a lot of memory and any underlying performance-related issues, for example, high-load operations in progress, suboptimal SQL processing. Refer SAP HANA Administrative guide for more details."

HANA_USED_MEM_PCT

Description: HANA service shared memory used %

Collection interval: VERYHIGH

Policy: HANA_SharedMemoryUsage

Aspect: HANA Database Memory Usage

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0001:Hana_M0007 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 90, Warning / 70

Message Text: Rule1: Shared Memory Usage is <VALUE>% (threshold is <THRESHOLD>%) [Policy: <NAME>]

Message Text: Rule2: Shared Memory Usage is <VALUE>% (threshold is <THRESHOLD>%) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : High percentage of allocated shared memory is being used by the service on a host

Potential Impact: Performance.

Suggested Action(s) : Consider increasing the shared memory size."

HANALOGBKSTATUS

Description: HANA last log backup status

Collection interval: HIGH

Policy: HANA_LogBackupStatus

Aspect: HANA Backup Status

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0004:Hana_M0004 / HANA_DATA

Message Category: HANA

Severity / Threshold: Major / 2.5, Minor / 1.5, Warning / 0.5

Message Text: Rule1: Last log backup failed [Policy: <NAME>]

Message Text: Rule2: Last log backup is pending cancellation [Policy: <NAME>]

Message Text: Rule3: Last log backup is cancelled [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : Last backup may not be successful.

Potential Impact: Data loss in case of failure.

Suggested Action(s) : View the backup catalog, which provides information about the execution and history of data and log backups. To diagnose backup errors, refer to the files backup.log and backint.log files."

HANAEXECCNT

Description: HANA Database Execution Count

Collection interval: VERYHIGH

Policy: HANA_ExecutionCount

Aspect: HANA Work Load

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0036:Hana_M0005 / HANA_DATA

Message Category: HANA

Severity / Threshold: Major / 1000

Message Text: Total count of executed statements per minute is <VALUE> (Threshold is <THRESHOLD>) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : Total count of executed statements

Potential Impact: Performance

Suggested Action(s) : Total count of executed statements by executing the following SQL statement: ALTER SYSTEM DISCONNECT SESSION <LOGICAL_CONNECTION_ID>. For more information, see the table EXECUTION_COUNT ."

HANAUsdPhyAlcLtMmPc

Description: HANA UsedPhyByAllocLimit_MemPct

Collection interval: MEDIUM

Policy: HANA_PhyMemAllocUsage

Aspect: HANA Database Space Usage

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0006:Hana_M0011 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 90, Warning / 80

Message Text: Rule1: Used Physical Memory against Allocation is <VALUE>% (threshold is <THRESHOLD>%) [Policy: <NAME>]

Message Text: Rule2: Used Pysical Memory against Allocation is <VALUE>% (threshold is <THRESHOLD>%) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : High percentage of total physical memory available on the host is used. All processes consuming memory are considered, including non-SAP HANA processes.

Potential Impact: Performance.

Suggested Action(s) : Investigate memory usage. Identify which services are consuming a lot of memory and any underlying performance-related issues, for example, high-load operations in progress, suboptimal SQL processing. Refer SAP HANA Administrative guide for more details."

HANASERVICEINACTCNT

Description: HANA inactive services count

Collection interval: VERYHIGH

Policy: HANA_InactiveserviceCnt

Aspect: HANA Database Availability

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0011:Hana_M0002 / HANA_DATA

Message Category: HANA

Severity / Threshold: Major / 0.5

Message Text: Number of inactive services is <VALUE>(threshold is <THRESHOLD>%) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : One or more services are not started.

Potential Impact: The system is not operational and can be accessed in diagnosis mode only.

Suggested Action(s) : Restart the services manually using system privilege SERVICE ADMIN. Refer SAP HANA Administrative guide for more details."

HANADAYSTOLICEXPRY

Description: HANA days for license to expire

Collection interval: LOW

Policy: HANA_LicenseExpiration

Aspect: HANA License Status

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0014:Hana_M0003 / HANA_DATA

Message Category: HANA

Severity / Threshold: Major / 15, Minor / 30

Message Text: Rule1: License will expire in <VALUE> day(s) (Threshold is <THRESHOLD> day(s)) [Policy: <NAME>]

Message Text: Rule2: License will expire in <VALUE> day(s) (Threshold is <THRESHOLD> day(s)) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : Less number of days until your license expires.

Potential Impact: Once your license expires, you can no longer use the system, except to install a new license.

Suggested Action(s) : Obtain a valid license and install it."

HANACNNUSEDPCT

Description: HANA used %

Collection interval: VERYHIGH

Policy: HANA_ConnectionCountUsage

Aspect: HANA Work Load

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0029:Hana_M0005 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 90

Message Text: Percentage of connections used is <VALUE> (Threshold is <THRESHOLD>) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : High percentage of the maximum number of permitted SQL connections are open.

Potential Impact: New user connection failure.

Suggested Action(s) : The maximum number of permitted connections is configured in the session section of the indexserver.ini file. Investigate why the maximum number of permitted open connections is being approached and cancel session as appropriate. It is possible to reserve a certain number of connections so that administrators (that is, users with the system privilege SESSION ADMIN) can always access the system, even if the maximum number of connections has been reached."

HANABLCKTRANSCNT

Description: HANA no. of block transactions

Collection interval: VERYHIGH

Policy: HANA_BlockedTransactCount

Aspect: HANA Work Load

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0017:Hana_M0003 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 1

Message Text: Number of blocked transactions is <VALUE> (Threshold is <THRESHOLD>) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : One or more transaction is waiting for locks.

Potential Impact: Performance.

Suggested Action(s) : Review the blocking and blocked transactions, and if appropriate cancel one of them. Refer SAP HANA Administrative guide for more details."

HANACURMEMUSGRT

Description: HANA Database Current Memory Usage Rate

Collection interval: VERYHIGH

Policy: HANA_CurrentMemoryUsageRate

Aspect: HANA Work Load

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0031:Hana_M0005 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 60

Message Text: Total size of used memory per minute is <VALUE> (Threshold is <THRESHOLD>) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : Total size of used memory per minute

Potential Impact: Performance

Suggested Action(s) : Total size of used memory per minute by executing the following SQL statement: ALTER SYSTEM DISCONNECT SESSION <LOGICAL_CONNECTION_ID>. For more information, see the table CURRENT_MEMORY_USAGE_RATE (_SYS_ STATISTICS)."

HANALSTSVPNTTIME

Description: HANA last save point in sec

Collection interval: VERYHIGH

Policy: HANA_LastSavePointTime

Aspect: HANA Work Load

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0024:Hana_M0006 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 3600, Warning / 900

Message Text: Rule1: Last save point is <VALUE> sec old (Threshold is <THRESHOLD> sec) [Policy: <NAME>]

Message Text: Rule2: Last save point is <VALUE> sec old (Threshold is <THRESHOLD> sec) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : Last savepoint, that is, complete consistent image of the database was persisted to disk, is longer than expected.

Potential Impact: Data loss in case of failure.

Suggested Action(s) : The frequency at which savepoints are defined can be configured in the persistence section of the global.ini file (every 5 minutes by default). Savepoints are also triggered automatically by a number of other operations such as data backup, and database shutdown and restart. Investigate why there was a delay defining the last savepoint and consider triggering the operation manually. To do so execute SQL statement ALTER SYSTEM SAVEPOINT."

HANA Internal Alerts

Description: Policy to collect HANA internal events

Collection interval: VERYHIGH

Policy: HANA_Collect_InternalEvents

Aspect: Hana Database Alerts

CIT:

Alarming / Logging: Logging

Data source/ Data class: HANA_C0023:Hana_M0006 / NA

HANA_RCRD_B

Description: HANA non-partitioned table record count (million)

Collection interval: MEDIUM

Policy: HANA_NonPartitionRcrdCount

Aspect: HANA Database Memory Usage

CIT:

Alarming / Logging: Alarming / Logging

Data source/ Data class: HANA_C0008:Hana_M0004 / HANA_DATA

Message Category: HANA

Severity / Threshold: Minor / 300, Warning / 100

Message Text: Rule1: Records of not partitioned Tables is <VALUE>Million (threshold is <THRESHOLD>Million) [Policy: <NAME>]

Message Text: Rule2: Records of not partitioned Tables is <VALUE>Million (threshold is <THRESHOLD>Million) [Policy: <NAME>]

Instruction Text:

Probable Cause(s) : High number of records in tables.

Potential Impact: Performance.

Suggested Action(s) : Row-based storage is typically suitable for small tables with frequent single updates. If the table is expected to grow significantly, consider moving it to column storage."

Send documentation feedback

If you have comments about this document, you can contact the documentation team by email. If an email client is configured on this system, click the link above and an email window opens with the following information in the subject line:

Feedback on User Guide (OMi Management Pack for SAP HANA 2.00)

Just add your feedback to the email and click send.

If no email client is available, copy the information above to a new message in a web mail client, and send your feedback to docfeedback@hpe.com.

We appreciate your feedback!