

# HP Value Stream

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Detect to Correct with SAP Best Practices

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# Contents

Detect to Correct with SAP Best Practices .....	1
Contents .....	3
Chapter 1: Detect to Correct Value Stream with SAP .....	5
Overview .....	5
Who Should Read This Guide .....	6
Chapter 2: How D2C and SAP Work Together .....	7
Overview .....	7
Chapter 3: Use Case Implementation .....	11
Overview .....	11
Step 1: Monitors report their data into BSM and events are correlated to causal and symptom events .....	12
Step 2: HP OO used (from BSM) to run diagnostics and check status of the service .....	12
Step 3: Incident opened from the causal event .....	13
Step 4: HP OO flow launched from the Incident through SM KM to automate a workaround fix like restart .....	13
Step 5: Incident handling .....	13
Step 6: Problem opened from the incident in SM .....	14
Step 7: Defect opened to address root cause of the problem. Integration between SM and ALM allows creation of ALM defect based on SM Problem fields .....	14
Step 8: To apply permanent fix, RFC opened from the problem in SM .....	14
Step 9: To automate the Change Implementation, OO is invoked .....	14
Chapter 4: Configuration and Setup .....	15
SAP Reference Implementation Core .....	16
Configure UD to populate UCMDB with SAP system landscape details and topology .....	16
Model the SAP Business Services in UCMDB .....	19
Overview .....	19
General Implementation Guidelines .....	19
Define First Logical Layer .....	21
Connect Infrastructure CIs to Logical CIs .....	21
Configure UCMDB-BSM integration and modify to sync SAP CIs .....	22

Configure UCMDB-BSM CI synchronization .....	24
Detect SAP events and forward to HPOM .....	24
Overview .....	24
Create SAP Dummy Alerts to Test Integration .....	24
SAP's Solution Manager MAI and LMDB .....	25
Event Forwarding from SAP Solution Manager via SAP SPI .....	25
Solution Manager events forwarded to HPOM .....	26
Event Forwarding from HPOM to BSM .....	27
Event Correlation in BSM .....	28
Overview .....	28
Event assigned to CI and HI .....	28
Create and assign additional Health Indicators (if needed) .....	30
Topology view required for TBEC .....	31
KPI Assignment .....	31
Create Correlation rule using TBEC .....	32
Work Mode Management .....	33
BSM forwards events as incidents to SM .....	34
SM forwards specific incidents to SAP Solution Manager .....	34
Incident Exchange .....	34
SM Problems forwarded to ALM as defects (requirements) .....	36
<b>Chapter 5: Abbreviations .....</b>	<b>37</b>
<b>Chapter 6: Resources .....</b>	<b>39</b>
Additional Online Resources .....	40

# Chapter 1: Detect to Correct Value Stream with SAP

This chapter includes the following topics:

Overview .....	5
Who Should Read This Guide .....	6

## Overview

The HP Detect to Correct (D2C) Value Stream frames what needs to happen to keep IT services operating at agreed-upon levels and getting back on track as quickly as possible when things go wrong. Furthermore, it aims to pro-actively understand operational risk exposure and avoid problems in the first place, all of which requires good understanding of good data. The Value Stream is focused on IT activities such as configuration management; event detection; diagnostics; incident, change, problem management; and remediation.

**Tip:** For a better understanding of this guide, see the [HP Detect to Correct Value Stream documentation](#).

This best practices guide covers selected integration aspects for D2C with SAP. This document focuses on the activities which bridge the gap between HP's IT Management Portfolio and SAP Solution Manager version 7.1. This is accomplished using the following integrations:

- HP Operations Manager (HPOM) SAP Smart Plug-in (SAP SPI) with the SAP Solution Manager Alert Interface (MAI)
- HP Universal CMDB (UCMDB) UD SAP Discovery with SAP Landscape Management Database (LMDB)
- HP Service Manager Incident Exchange (SMSSMEX) with SAP Solution Manager Service Desk

In addition to these integrations, BSM's end-user monitoring (EUM) can be used to monitor SAP application modules.

## Who Should Read This Guide

This guide is intended for:

- SAP Basis experts that work with integrating SAP products with non-SAP applications and technology
- Members of the SAP Customer Competence Center or Center of Excellence
- Quality automation engineers
- IT personnel
- Network managers
- Presales and sales personnel
- IT consultants interested in SAP
- Anyone who wants to learn about the end-to-end service monitoring and event management best practices, as well as incident management and change management for SAP with HP Software

The information in this guide may duplicate information available in other Detect to Correct Value Stream documentation, but is provided here for convenience.

# Chapter 2: How D2C and SAP Work Together

This chapter includes the following topic:

Overview ..... 7

## Overview

The Detect to Correct (D2C) Value Stream is meant to handle the IT operations work done on a daily basis on all IT business services, applications, and infrastructure environments.

Applications include complex and business-critical SAP environments. Management of this business-critical yet increasingly complex SAP environment, integrated with other non-SAP applications and infrastructure, plus the challenge to manage modern hybrid Cloud, must be handled end-to-end. Monitoring the availability and performance of SAP applications themselves is only one part of the solution—for example, ERP, NetWeaver, Application Server, the Enterprise portal, CRM, SCM, and so on. Non-SAP applications and infrastructure that are part of a given business process must also be monitored.

In complex customer landscapes, business services supporting critical business processes spawn various application landscapes that include but are not limited to SAP—for example, Microsoft and self-made applications; or industry-specific applications for manufacturing, insurance, banking, telecom, and others.

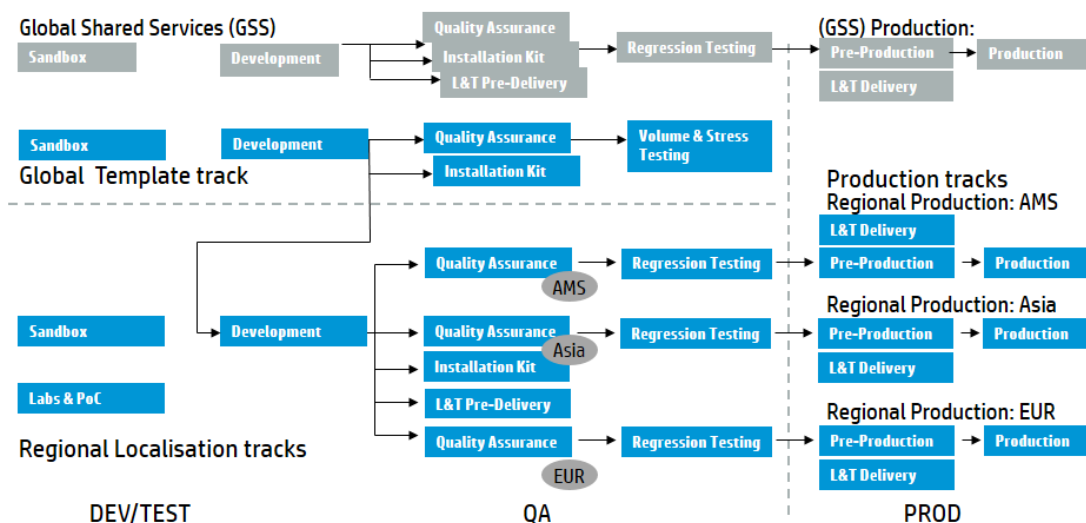
It is mandatory for IT to have the appropriate organizational setup to align SAP teams with non-SAP and Enterprise-oriented teams.

The overall organizational setup for a customer to manage such heterogeneous landscapes is important—where often specific applications or layers are partly outsourced, or where services are consumed via Cloud Service Provider offerings.

In large IT organizations, SAP teams are organized as a SAP Center of Excellence, with a specific focus on SAP and appropriate SAP support integrations via their Solution Manager. Often these teams, at least in large organizations, use MaxAttention support contracts to interact with SAP Active Global Support and to optimize their SAP specific setups, processes, and organization. These structures need to be embedded and interlinked with the Enterprise Management groups supported by HP D2C for SAP.

There has to be a clear separation of what the team for SAP does and how the rest of the system monitoring and coordination is accomplished. Avoiding duplication of tasks is an important business case. The efficiency benefits of doing this properly assures that team overlap is reduced, correct experts are involved, and system interruptions are limited. It also assures that the customer's SAP organization, with SAP Active Global Support, gets involved with only their SAP-specific issues and that there is cross-organizational team alignment.

The following figure displays a typical SAP blueprint, with the life cycle, depicting the typical components within a complex SAP landscape. In such a landscape, SAP applications coexist with other integrated applications such as mail systems, SAP's Archiving Solution, Printing, Production, Procurement, Disaster Recovery Solutions, Backup Solutions, and others. Each box shown in the figure can host several applications from SAP and others.



In addition, all of these applications sit on top of a complex set of hardware, virtualization technology, and software infrastructure, including the network (routers, switches, firewalls), servers (hardware and operating system), and other software infrastructure (DNS, LDAP, and so on). The tools and services provided by SAP for managing the SAP-specific environment, mainly SAP Solution Manager, complement HP's Detect to Correct Value Stream supporting products by providing SAP-specific information in the correct context. SAP-specific integrations, combined with non-SAP-related integrations, are available from HP and can be used to assist with management of this complex landscape.

Given how critical SAP is for many customer's businesses, and the need to deliver specified service levels, a D2C solution for SAP environments must also provide for monitoring the actual user experience. It must allow for assuring and measuring performance against contractual service level agreements (SLAs). This is no longer about just intra-company services. SAP business processes can extend to suppliers, partners, and customers. Service outages do not just impact the customer; they may also affect a customer's relationship with its suppliers, partners, and customers.

Within the global customer support organization's interaction with the IT supplier (hosting provider, cloud service provider), there are different levels of support through which incidents and service requests are processed and resolved.

SAP products serve Enterprise customers by enabling their crucial business activities. Managing SAP products and the services they deliver is of the utmost importance for IT departments.

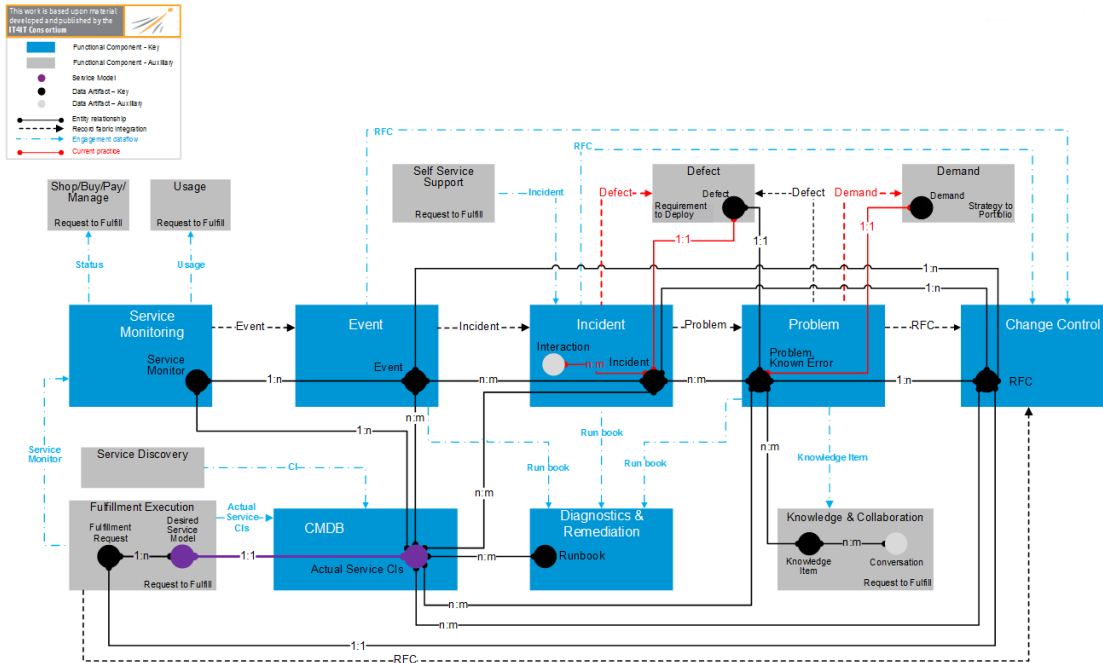
Over the years, various contact points were identified and multiple integration capabilities were developed to enable coexistence.



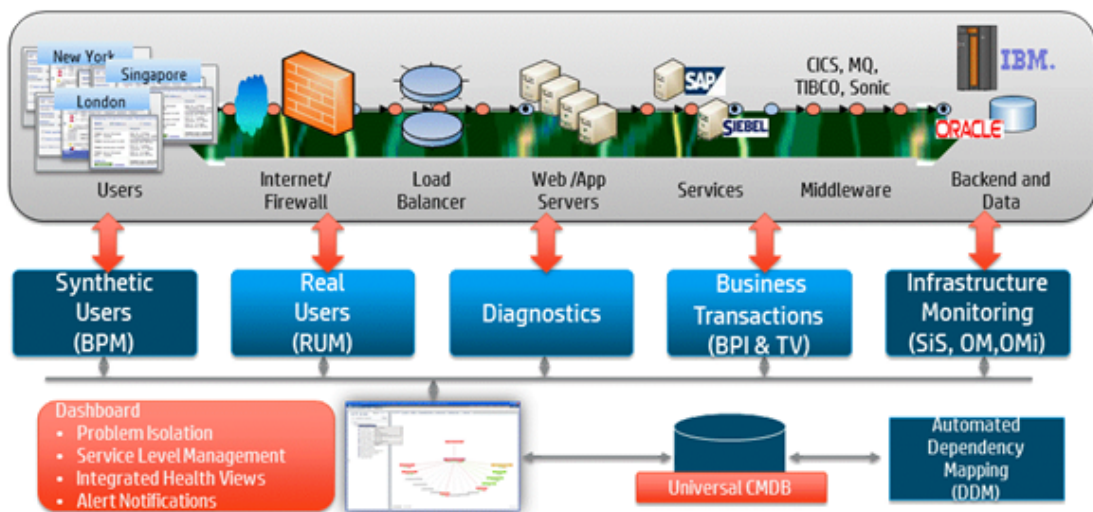
Rooted in an initiative called Reference Architecture, we look at the Detect to Correct Value Stream and its implementation using HP Software tools in the context of the business need to manage the services provided by SAP tools.

The Detect to Correct Value Stream provides a framework for integrating the monitoring, management, remediation, and the operational aspects associated with realized services and/or those under construction.

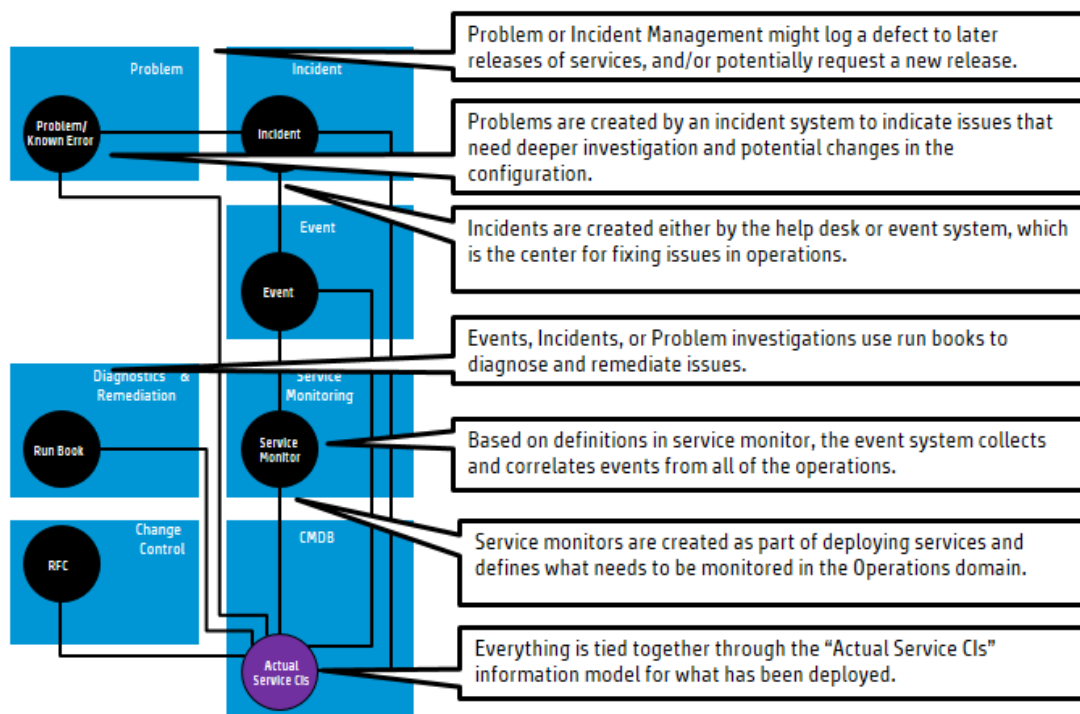
This document addresses how this is done specifically for services enabled via SAP tools.



Various HP Software Products managing a combination of SAP and non-SAP products are displayed below:



The following detailed view of the key functional components defined in the Detect to Correct Value Stream serves as an overview for those readers who are not yet familiar with the HP Software Detect to Correct documentation.



In order to manage and monitor various SAP products and SAP landscapes, SAP recommends using SAP Solution Manager as the Central Monitoring Framework and Intelligent Management Agent to link into the HP IT Management Portfolio suite of products supporting the D2C Value Stream.

To integrate with Enterprise Management platforms, SAP Solution Manager, version 7.1 and above, uses the new Monitoring Alert Interface (MAI)—a new technology that replaces previous technologies such as the Computing Center Management System (CCMS). SAP SPI still supports the CCMS for backward compatibility, but both SAP and HP recommend moving forward to MAI-based monitoring and alerting. It is recommended to use Solution Manager and fade out the prior CCMS.

Using the MAI capabilities provides valuable insight into HP Service Management tools about SAP software composition and status. Combined with HP capabilities in discovering, modeling, and monitoring the services, this allows better, more effective management.

The information in this guide may duplicate information available in other Best Practices documentation and must be combined with SAP's guided procedures stored in the [SAP Software Developer's Network](#) for SAP Solution Manager version 7.1 or found at the SAP Solution Manager and Support Web site. This document will review those touch points and integrations in the context of enabling a comprehensive end-to-end IT management process—crossing product and vendor-specific boundaries.

# Chapter 3: Use Case Implementation

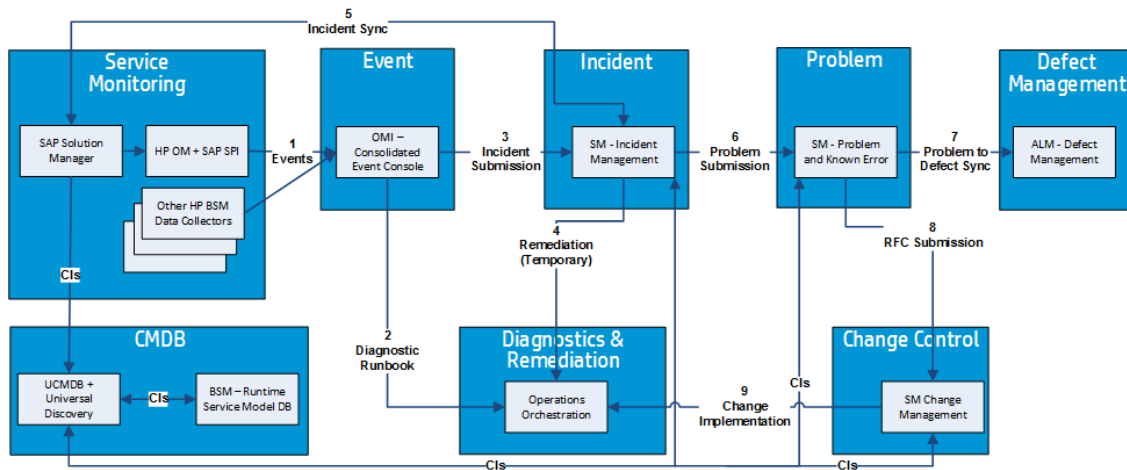
This chapter includes the following topics:

- Overview ..... 11
- Step 1: Monitors report their data into BSM and events are correlated to causal and symptom events ..... 12
- Step 2: HP OO used (from BSM) to run diagnostics and check status of the service ..... 12
- Step 3: Incident opened from the causal event ..... 13
- Step 4: HP OO flow launched from the Incident through SM KM to automate a workaround fix like restart ..... 13
- Step 5: Incident handling ..... 13
- Step 6: Problem opened from the incident in SM ..... 14
- Step 7: Defect opened to address root cause of the problem. Integration between SM and ALM allows creation of ALM defect based on SM Problem fields ..... 14
- Step 8: To apply permanent fix, RFC opened from the problem in SM ..... 14
- Step 9: To automate the Change Implementation, OO is invoked ..... 14

## Overview

This chapter provides a high level data flow for the main use case of the Detect to Correct Value Stream—taking the management of a SAP stack as an example.

The following diagram describes how artifacts are created and maintained between the various HP and SAP Products that implement the Functional Components described in "Detect to Correct Functional Components" on page 16 of the [HP Detect to Correct Value Stream Concept and Configuration Guide](#).



The following prerequisites must be met before implementing the use case main flow:

- HP Universal Discovery (UD) populates HP Universal CMDB (UCMDB). This includes the discovery of SAP Solution Manager and other SAP systems that it manages (not shown in the diagram).
- SAP Services are modeled in UCMDB, then the CIs and relations are synchronized between UCMDB and HP Business Service Management (BSM). The out-of-the-box integration must be modified to include additional configuration item (CI) types and their relations.
- UCMDB syncs SAP CIs, relations, and modeled services to HP Service Manager (SM).

## Step 1: Monitors report their data into BSM and events are correlated to causal and symptom events

Events emerging from SAP systems (like ERP or CRM) under its management are pulled by the SAP OM SPI and are forwarded to HP Operations Manager, which in turn makes them available in the HP Operations Management module of BSM.

Events from SAP monitoring and alerting infrastructure can be correlated with events from other domains—infrastructure, end-user monitoring, and so on.

**Note:** For more information about extensive business service monitoring, see the [HP Best Practices End-to-End Service Monitoring and Event Management Guide](#). The products, technologies, and approaches described therein apply to complex SAP systems. This includes advanced application-level monitoring tools, such as HP BPM, RUM, and Diagnostics.

## Step 2: HP OO used (from BSM) to run diagnostics and check status of the service

BSM has the ability to call HP OO in order to diagnose and investigate the status of the service. The HP Operations Orchestration (HP OO) – SAP Business Application Programming Interfaces (BAPI) content pack provides capabilities to automate SAP-related tasks. The HP OO – SAP integration introduced with HP OO version 10.x includes the capability to invoke SAP BAPI. Via a wizard, available SAP BAPI calls can be selected and used for several automation tasks related to D2C. For more information, see the [HP OO version 10.01 Windows Third Party Integration Guide](#).

Another possible approach is using HP OO to execute HP Load Runner VUGen scripts to achieve a higher level of SAP automation in a non-intrusive way. HP Load Runner VUGen scripts are usually used by SAP development teams in the testing process, as it supports multiple SAP protocols, including SAP-Web, SAP GUI and SAP (Click & Script). This knowledge and sometimes existing content can be leveraged to automate time consuming tasks needed to operate the SAP services by IT Operations teams.

An integration between BSM and HP OO allows invoking OO flows in the context of BSM events, while allowing the automatic execution of SAP troubleshooting tasks in the context of the specific SAP system as defined by event attributes and related CI types.

The SAP Solution Manager Guided Procedure and IT Task Management applications in the Technical Administration Work Center provide an integrated tool set to document and define recurring administrative tasks as guided procedures, as well as plan the execution of the defined guided procedures. In these guided procedures, HP OO Runbooks can be integrated to also allow automation of the procedures.

**Note:** For more information about setting up the BSM – OO integration, see the [HP Detect to Correct Value Stream Concept and Configuration Guide](#).

## Step 3: Incident opened from the causal event

When BSM operators identify that the event has a potential impact on service consumers that cannot be resolved using the tools at their disposal, they can escalate the case as an SM Incident. Integration between BSM and SM allows the forwarding of the event while transferring the full context of the event (including the event description, related CI, and more), and can be customized to fit specific requirements.

Moreover, the integration supports automatic forwarding of specific events according to a customer-defined event filter.

## Step 4: HP OO flow launched from the Incident through SM KM to automate a workaround fix like restart

While working on resolving incidents, SM users use information from Knowledge Management (KM) articles. This allows faster resolution for frequently occurring issues. An automation flow can be linked to a specific KM article to enable faster execution of resolution steps and reduce the chance of human error for complex, multi-step tasks—for example, in the context of SAP, changing application server settings from batch processing to dialog mode to facilitate a higher user load.

## Step 5: Incident handling

A BSM to SM integration can automatically assign the incident to a specific assignment group in SM. For SAP-related incidents, this would usually involve SAP groups that consist of SAP specialist IT personnel. If incident analysis concludes that SAP Global Support must be involved, the integration between SM and the SAP Solution Manager Service Desk module is invoked, and bidirectional synchronization of incident details allow holistic management of the complete incident management process.

**Note:** HP recommends that HP Service Manager is the master of records system for incidents.

## **Step 6: Problem opened from the incident in SM**

In ITIL, the resolution of an incident does not always imply fixing the original cause. The incident management process strives to restore the functionality of the service as soon as possible, but resolving the underlying cause is an area handled by problem management. Out-of-the-box SM work flows allow the creation of problem records based on the incident, as well as linking multiple incidents to a single problem—for example, in the context of SAP, the need to apply a specific patch on a system for better handling of a specific load (while the incident could be temporarily resolved by restart/manual cleanup of queues).

## **Step 7: Defect opened to address root cause of the problem. Integration between SM and ALM allows creation of ALM defect based on SM Problem fields**

In the context of SAP, referring to the previous example in "[Step 6: Problem opened from the incident in SM](#)", the problem investigation process identified an issue with a specific application, which requires a code change in the application. The SM – ALM integration is utilized to open a Defect (in some cases a Requirement) containing all of the relevant information.

## **Step 8: To apply permanent fix, RFC opened from the problem in SM**

The defect in the application code is resolved and the fix is available as a patch/hotfix. It cannot be implemented directly on the production system. A request for change (RFC) should be filed. The RFC goes through the change life cycle using HP Release Control (RC) to evaluate, assess, and schedule the Change Implementation.

## **Step 9: To automate the Change Implementation, OO is invoked**

To execute the change implementation in a faster and more reliable way, the OO flow that installs the patch can be linked to a specific change record and triggered once it reaches a specific phase—or triggered manually by the user.

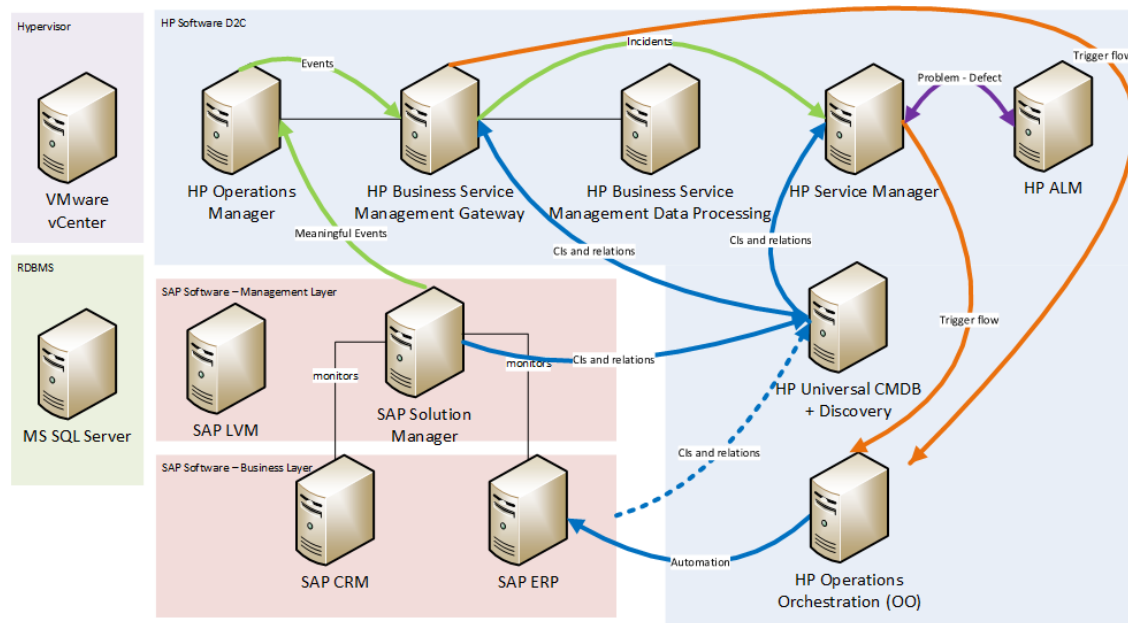
# Chapter 4: Configuration and Setup

**This chapter includes the following topics:**

SAP Reference Implementation Core .....	16
Configure UD to populate UCMDB with SAP system landscape details and topology .....	16
Model the SAP Business Services in UCMDB .....	19
Overview .....	19
General Implementation Guidelines .....	19
Define First Logical Layer .....	21
Connect Infrastructure CIs to Logical CIs .....	21
Configure UCMDB-BSM integration and modify to sync SAP CIs .....	22
Configure UCMDB-BSM CI synchronization .....	24
Detect SAP events and forward to HPOM .....	24
Overview .....	24
Create SAP Dummy Alerts to Test Integration .....	24
SAP's Solution Manager MAI and LMDB .....	25
Event Forwarding from SAP Solution Manager via SAP SPI .....	25
Solution Manager events forwarded to HPOM .....	26
Event Forwarding from HPOM to BSM .....	27
Event Correlation in BSM .....	28
Overview .....	28
Event assigned to CI and HI .....	28
Create and assign additional Health Indicators (if needed) .....	30
Topology view required for TBEC .....	31
KPI Assignment .....	31
Create Correlation rule using TBEC .....	32
Work Mode Management .....	33
BSM forwards events as incidents to SM .....	34
SM forwards specific incidents to SAP Solution Manager .....	34
Incident Exchange .....	34
SM Problems forwarded to ALM as defects (requirements) .....	36

## SAP Reference Implementation Core

HP Software's Detect to Correct (D2C) Value Stream Reference Implementation components, integrated with some typical SAP components, are displayed below. This setup illustrates the landscape ingredients that form the Detect to Correct core.



**Note:** Production landscapes (including SAP and HP) are much more complex when compared to the sample lab setup shown in this figure. The environments are usually implemented using multiple instances—such as Development, Testing, Quality Assurance, and Production.

## Configure UD to populate UCMDB with SAP system landscape details and topology

HP Universal Discovery (UD) offers out-of-the-box content which can connect to the SAP Solution Manager system and collect up-to-date and detailed information about SAP systems connected to it. This information is stored in UCMDB and is used in multiple management processes discussed further in this document. In addition, it has other discovery patterns to connect to information sources, other than Solution Manager, to find out configuration information not stored or maintained in Solution Manager.

For complete configuration and setup instructions, see "Introduction to SAP Discovery" on page 492 in the [Discovery and Integration Content – Discovery Modules](#) document, or in the product online help.



As described in "Use Cases" on page 20 in the [HP Detect to Correct Concept and Configuration Guide](#), there is a requirement to populate the HP Universal CMDB (UCMDB) with relevant and accurate data about configuration items (CIs) and their relations. The following prerequisite must be met before implementing the use case main flow:

- Discovery populates UCMDB, and UCMDB syncs the CIs to HP Service Manager (SM) and HP Business Service Management (BSM).

When a SAP system, such as ERP or CRM, is configured or maintained, it is expected to be registered to an appropriate Solution Manager instance. This is a requirement from SAP support. Doing this ensures Solution Manager has an up-to-date map of existing SAP environments and their components. UCMDB Universal Discovery has the capability of integrating with Solution Manager and populating this information into UCMDB.

Universal Discovery is used to discover and report infrastructure-related information into UCMDB. Thus, we get a complete and accurate representation of the IT landscape in UCMDB, including, but not limited to, hardware details, running software, network configurations, and so on.

To discover the SAP landscape, install and configure the SAP Java Connector (SAP JCO) on the discovery probe, configure the discovery jobs by providing user credentials with sufficient permissions, and activate SAP discovery jobs. In a demo/POC environment, a SAP user can be used. Otherwise the required permissions are listed in the UCMDB documentation. Verify that SAP CI information is collected in the system.

Activated discovery patterns and the result of a successful discovery process are displayed below:

The screenshot displays the HP Universal Discovery interface. On the left, a tree view under 'Discovery Modules/Jobs' shows various discovery patterns. The 'SAP' category is expanded, and 'SAP Solution Manager Topology by SAP JCO' is selected. On the right, the 'Discovery Job Details' pane shows the following information:

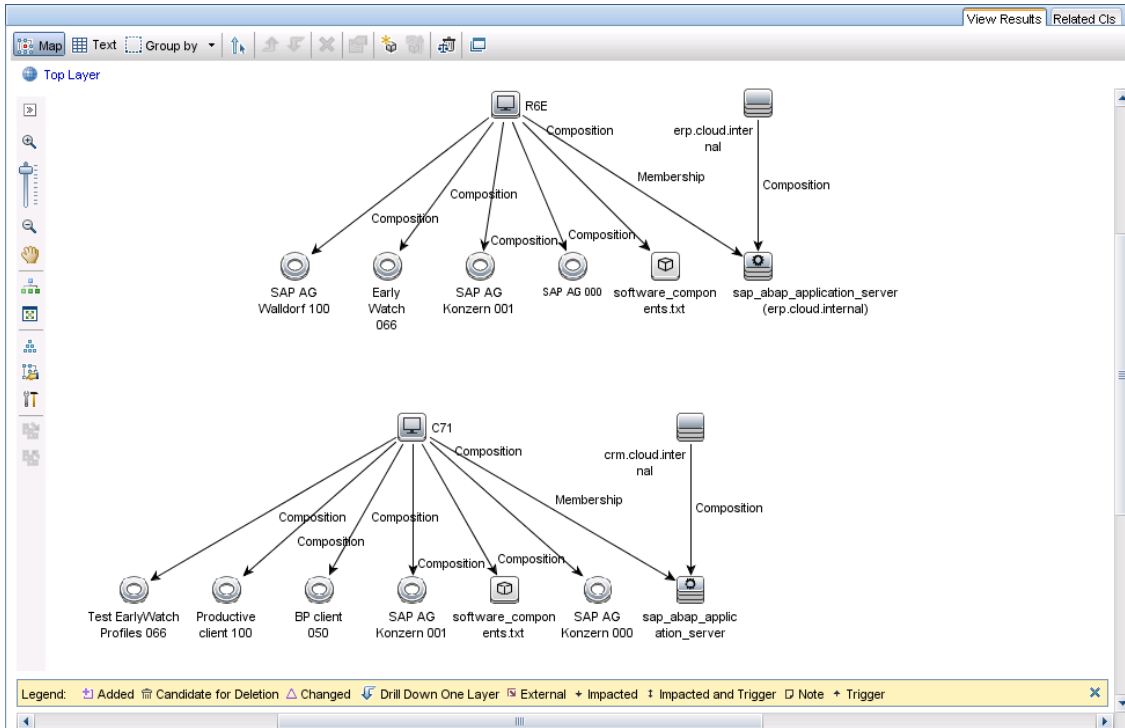
- Job Name: SAP Solution Manager Topology by SAP JCO [Package:SAP\_discovery.zij]
- Adapter: SAP Topology by Solution Manager ?
- Input CI Type: SAP ABAP Application Server
- Discovered CIs: ABAP SAP Central Services, ConfigurationDocument, Database, IpAddress
- Required Protocols: SAP Protocol

Below the details, the 'Discovery Results' pane shows a table of discovered Configuration Items (CIs). The filter is set to 'Time Range[All]'. The table lists various CIs and their counts.

CIT	Created
Composition	19
ConfigurationDocument	3
Containment	1
Dependency	2
IpAddress	0
JDBC Data Source	1
Membership	2
Node	1
SAP ABAP Application Server	2
SAP Client	12
SAP System	0
SQL Server	1
Windows	0
<b>Total</b>	<b>44</b>

**Note:** In an environment where the Solution Manager machine was connected with two Network Interface Controllers (NICs) and one was set up as primary, some SAP discovery jobs were failing until the primary IP of the Solution Manager server was included in the probe range. Otherwise it gave a **Probe not found** error.

The following graphic illustrates some discovery results related to reference landscape in graphical form:



## Model the SAP Business Services in UCMDB

This section includes the following topics:

Overview .....	19
General Implementation Guidelines .....	19
Define First Logical Layer .....	21
Connect Infrastructure CIs to Logical CIs .....	21

### Overview

A service model is composed of configuration items (CIs) and relationships. CIs represent the actual components of the real service. CIs and relationships are contained in the Configuration Management System (CMS). The CMS is a specific collection of data providers and consumers built around a Configuration Management Database (CMDB).

A service model exists to help its owners and administrators manage the service and its components throughout its life cycle and to ensure it provides the expected value to the organization. The service model is consumed by various people, processes, and tools in the management of IT environments.

Service Modeling is a process that creates service models. The proper execution of service modeling is required for many aspects of service management. For more information, see [HP Best Practices for Service Modeling](#).

The way that a simple CRM installation is represented in UCMDB as a service is described below. With appropriate modifications, this can also be used to model more complex environments, including infrastructure and network CIs.

### General Implementation Guidelines

Use the following guidelines:

- Use UCMDB's out-of-the-box SAP discovery patterns first and stick to the HP-defined data model as much as possible. Only change the data model or add attributes if necessary.
  - Perform landscape discovery in several phases. The first phase is infrastructure discovery. The second phase is for application resources such as SAP, TREX, HANA, databases (Oracle, DB2, MaxDB, HANA database, SQLServer, Sybase, VSE, and so on), host agents, message servers, application servers (ABAP, Java stack), Business Objects, SAP PI discovery via a Remote Function Call to Process Integration (PI) as the PI contains all of the integration points and communication protocols used.

**Note:** The discovery process may need modification depending on specific customer needs.

- Discover Solution Manager content, including Landscape Management Database (LMDB), and retrieve the information it has about the SAP systems, all application servers, all databases.

This information is normally updated by SAP installation tools and also SAP Landscape Virtualization Management (LVM) in SAP Solution Manager and should be kept up to date. Otherwise, use other available HP SAP Discovery patterns for collecting up-to-date data directly from deployed SAP systems.

- It is common for SAP tools to be integrated with other Enterprise systems. Leverage HP Software discovery patterns to discover integrated non-SAP environments—for example, non-SAP middleware, applications such as Apache, Sharepoint, OpenText (archiving solution in a SAP context), and many other non-SAP systems depending on the customer's landscape.
- Integrate UCMDB with an Asset Management System such as HP Asset Manager to, for example, extract the asset information like the equipment number, serial number, and so on.
- Integrate UCMDB with a Network Management tool to discover network CIs, such as switches and routers, in the landscape that SAP systems and communications rely on. These communication technologies and protocols also act as a basis for vulnerability checks later on.
- Incorporate the discovery and modeling process to aid in finding security breaches and vulnerabilities. Even though the scope of this guide does not include the security management process, it is important to highlight this ability and the value it can provide for the operation of the services.

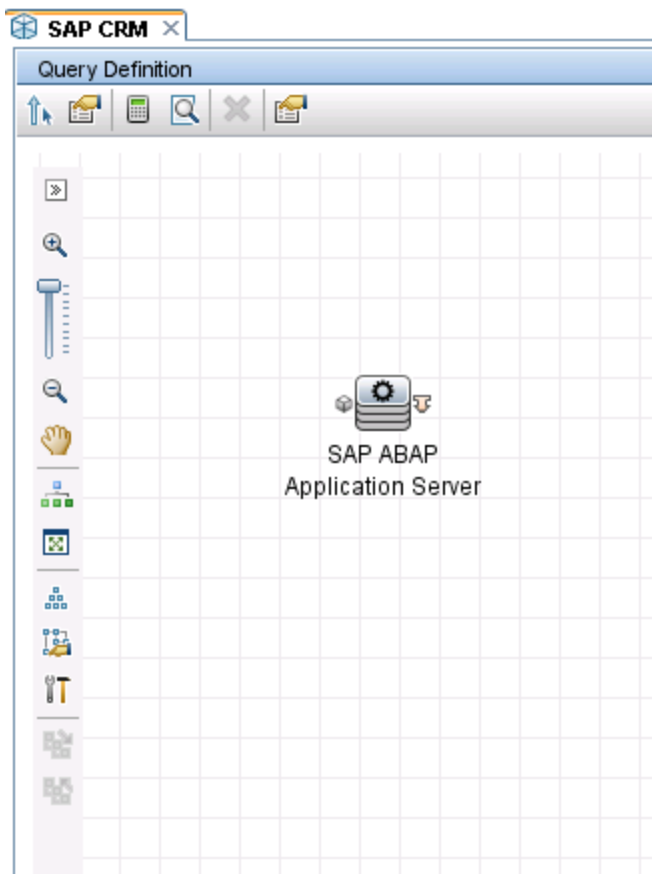
**Note:** For detailed security and vulnerability checks, HP recommends using the ArcSight software, which can also be combined with the BSM stack.

- Discover all of the landscape CIs supporting the business, providing the necessary information to identify areas that are sensitive with regards to application security. Analyze any potential issue you might have.
- Check SAP security compliance, such as whether a system is configured according to the guidelines.

## Define First Logical Layer

In this example, a CRM instance was selected to represent a business application. A business application was created as an Instance-based Model, and a specific SAP ABAP Application Server was added to it. Modify this by selecting **Query Node Properties** and filter accordingly or select a specific CI in the **Identity** tab. Do not forget to add the appropriate CIs to the model output by selecting it with a right-click. Then select the **Add to model output** option. Notice the small cube icon which indicates that the CI is included in the model output.

In this example, a new CI that contains the SAP ABAP application server was manually created. This SAP ABAP application server was discovered by Universal Discovery using SAP discovery content. The new CI is a logical CI type—Business Application. The SAP CRM business application model is displayed below.



## Connect Infrastructure CIs to Logical CIs

If the application depends on additional CIs, such as database service, web application, and others, add them to the model as well. A good practice is to assign them to corresponding CI collections—for example, Database CI collection, Application Service CI collection, and so on.

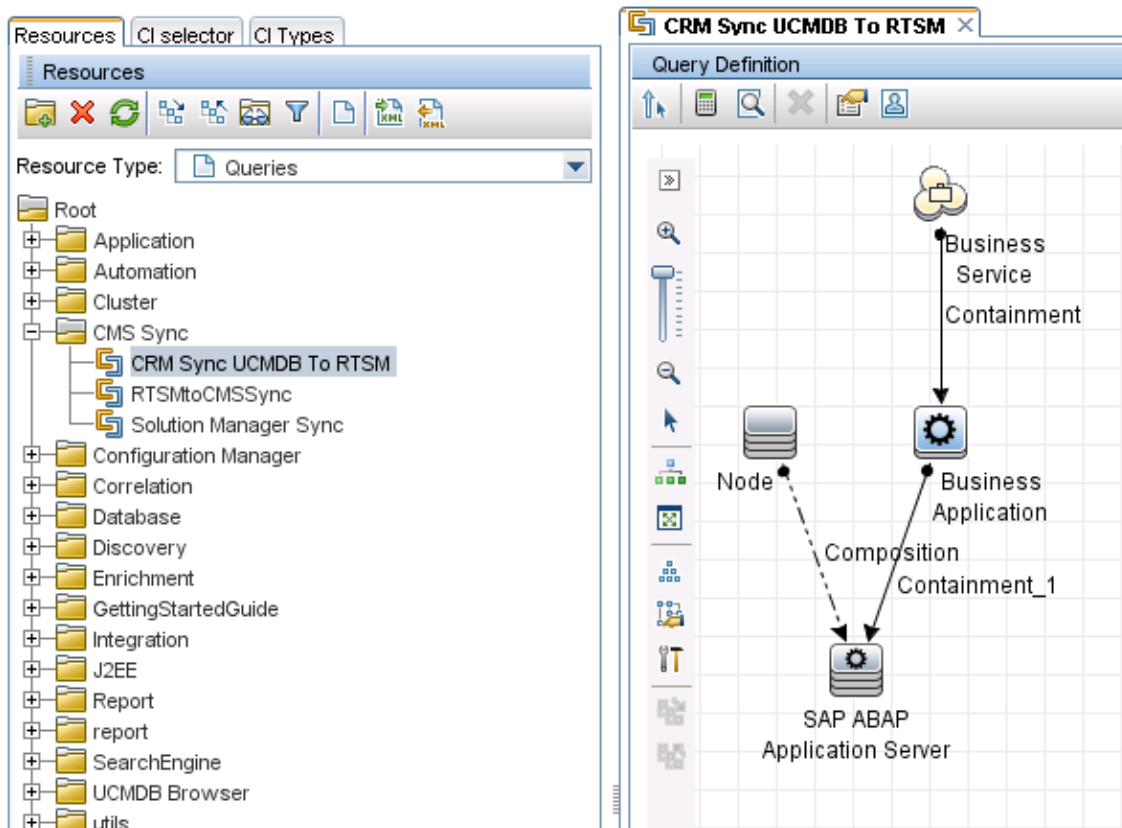
## Configure UCMDB-BSM integration and modify to sync SAP CIs

Set up the UCMDB – BSM integration as described in Chapter 6, "BSM-UCMDB Topology Synchronization" in [HP Business Service Management RTSM Best Practices](#).

The out-of-the-box integration does not include SAP CIs and relations. Modify the integration to include them. Basically the process includes creating integration queries on the UCMDB side—then exporting them, importing them into BSM, and creating integration jobs with those queries.

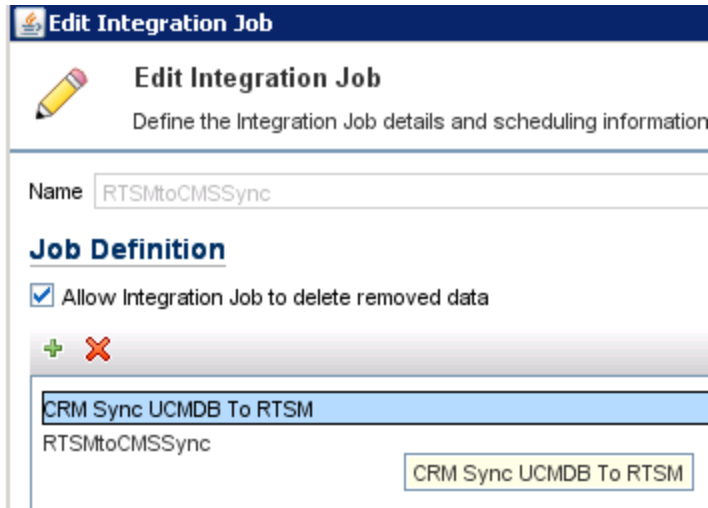
This section provides an example of a very limited set of CIs to be transferred from UCMDB to BSM.

In UCMDB Modeling Studio, create a TQL query which includes the appropriate SAP CI types, as well as relations between them. There is a layout in the following image for a simple CRM deployment. It includes the CRM Business Service, CRM Business Application, ABAP Application Server, and the actual Node on which the Application Server runs. Save this specified Query under the CMS sync folder in UCMDB.

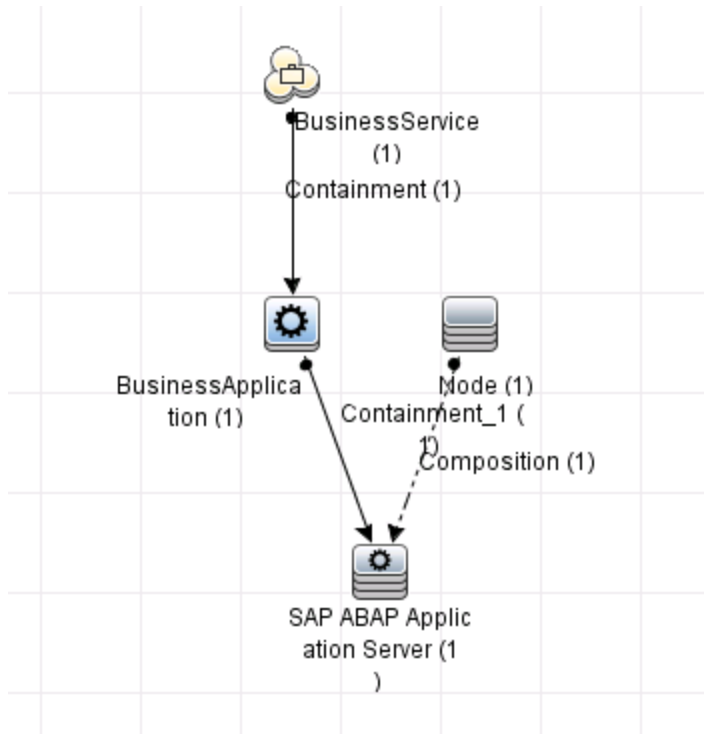


The next task is to export this TQL as a package and import it on the BSM side. This is done in the Package Manager module.

Then modify the configuration for integration between UCMDB and BSM by adding new job based on the new integration query.



Manually trigger the synchronization job. After it completes, verify that SAP CIs and appropriate relations exist in RTSM—for example, by calculating the integration TQL to make sure it returns results such as shown in the following figure:



## Configure UCMDB-BSM CI synchronization

HP recommends synchronizing specified and discovered CIs and relations between BSM Runtime Service Model (RTSM) and UCMDB. This allows propagation of a unique global ID for CIs, maintenance of up-to-date and detailed information in RTSM that is required for some monitoring activities, and enriches the topology of RTSM. For more details about the synchronization, see Chapter 6, "BSM-UCMDB Topology Synchronization" in [HP Business Service Management RTSM Best Practices](#), as well as documentation included in BSM Help.

## Detect SAP events and forward to HPOM

This section includes the following topics:

Overview .....	24
Create SAP Dummy Alerts to Test Integration .....	24
SAP's Solution Manager MAI and LMDB .....	25

### Overview

Install and configure HP SAP Smart Plug-in (SAP SPI) to receive alerts from SAP Solution Manager into HP Operations Manager (HPOM), which will then be forwarded to HP Operations Manager *i* (OMi).

For detailed instructions, see the [HP Operations Smart Plug-in for SAP Installation and Configuration Guide](#).

For detailed configuration and operations instructions, see the [HP Operations Smart Plug-in for SAP Printed Online Help](#).

### Create SAP Dummy Alerts to Test Integration

To troubleshoot the setup environment, triggering sample alerts helps to validate the end-to-end flow. HPOM and BSM offer command-line utilities to do this. To trigger sample alerts, use one of the following:

- **submit-events.bat** script, which allows easy creation of BSM events that include the necessary parameters, located in <HPBSM install folder>\op\support on the BSM Gateway server
- **opcmsg** command on any HPOM-managed node as described in [HP Operations Management for Windows Online Help](#).

To create custom metrics and alerts in Solution Manager, see [SysMon\\_Create custom metrics and alerts](#) in the SAP Community Network. Use this information to create a metric with a very low threshold that will regularly trigger an alert.

For detailed information on how to configure the SAP [SysMon\\_Create custom metrics and alerts](#), see the Developer Network (SDN) [SAP Application Operations](#) and search for **SysMon\_Create**



**custom metrics and alerts**, which provides a detailed description for how to create and test custom metrics.

- Use the **Create custom metrics and alerts** mechanism to specify a **Dummy Alert** to test the integration—for example, monitor a specific file and its size using a customer template in **Create Customer Template > Create Metric**.
- Once specified, test this template by creating a custom alert with **> Create Alert**.

**Note:** Make sure that when you are configuring the monitoring template, you switch to **Expert Mode**. In the **Third Party Components** tab, the **BADI for reacting to MAI Alerts and extracting the Alert/Event/Metric details** is listed as **Active**.

## SAP's Solution Manager MAI and LMDB

SAP Solution Manager, amongst its capabilities, offers real-time monitoring of deployed systems while having a complete picture of inter-dependencies between system components. For more information, see the [SAP Solution Manager](#) Web site.

SAP's Solution Manager end-to-end monitoring and alerting infrastructure (MAI) allows the stable and reliable operation of complex SAP system landscapes via SAP's Landscape Management Database (LMDB). To monitor the correct functioning of the landscape, a large number of metrics and alert types, as well as various applications, are available that provide prior warning about potential problems. For more information, see [Self-Monitoring for the Monitoring and Alerting Infrastructure](#).

## Event Forwarding from SAP Solution Manager via SAP SPI

In this chapter, we provide information on how events detected in SAP Solution Manager are forwarded to BSM using the SAP SPI and SAP Solution Manager version 7.1 or later. SAP Solution Manager acts as an advanced event aggregator from SAP systems and performs appropriate event detection and initial correlation of SAP-specific events. Aggregated information is sent via the MAI interface and BSM SAP SPI technology to HPOM.

The End-to-End Monitoring and Alerting Infrastructure (E2E MAI) within SAP Solution Manager (version 7.1 and later) includes an application known as **Alert Inbox** available within the **Technical Monitoring** work center. This application is the defacto consumer in Solution Manager of alerts of technical monitoring. Alerts from various Managed Objects in the landscape are displayed and handled via this application.

E2E MAI Alert Inbox is maintained via central Templates supporting forwarding of correlated Alerts.

This set of open interfaces, generally known as **Alert Consumer Connector**, is used to interconnect SAP Solution Manager MAI with HPOM SAP SPI.

The SAP interface, correctly configured, can send alerts to HP from the following categories:

- SAP System – DBMS
- SAP End-User Experience Monitor
- Connection Monitoring
- Process Integration Monitoring

## Solution Manager events forwarded to HPOM

HP Operations Manager SAP Smart Plug-in is used to collect events from SAP Solution Manager and forward them to the BSM Operations Management event console. SAP SPI is the HP recommended product for integration with the SAP Solution Manager monitoring and alert manager.

The following screen shot displayed in the **SAP Alert Inbox**:

Alert Description	Severity	Count
MS SQL Backup	Very high	2537
qRFC Errors	High	1301
High number of ABAP Short Dumps	High	3372
High Number of ABAP Short Dumps	Medium	8231
Errors in ABAP System Log	Low	116
Not Enough Dialog Resources	Low	387
Errors in Java Logs detected	Low	2
Not Enough Batch Resources	Low	1154

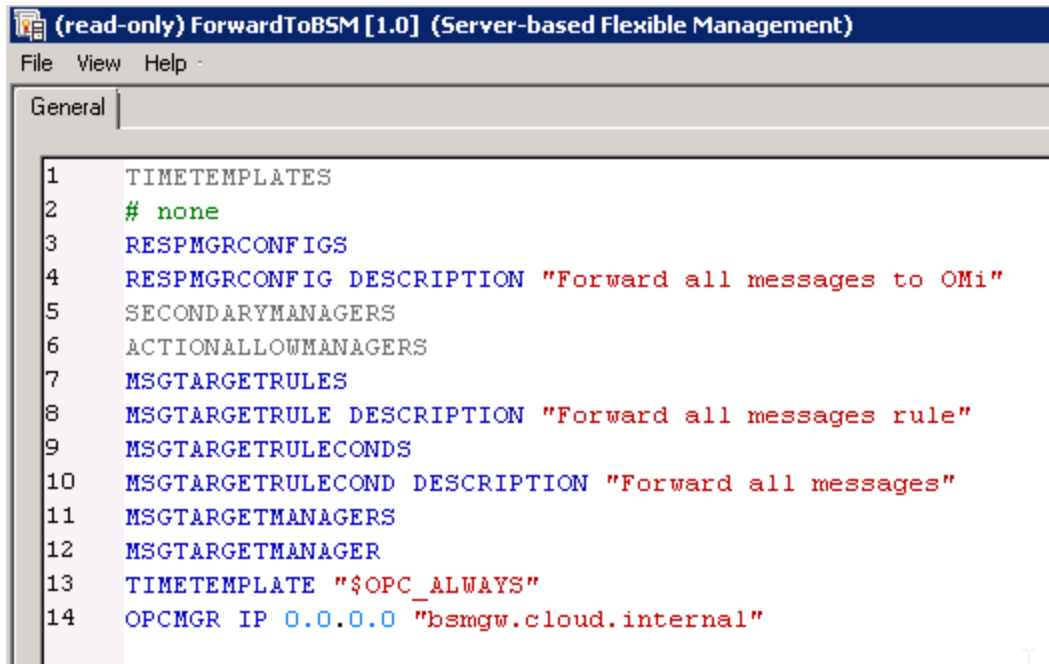
Alerts coming from SAP Solution Manager and arriving in the HPOM Event Browser are displayed below:

Severity	Duplicates	S	U	I	A	O	N	Node	Received	Text	Created
Critical	1	-	-	-	-	-	-	omw (Managem...	12/9/2013 8:20:03 PM	EventID: 0x0000400 (1024) - (ADP...	12/9/2013 8:21:00 PM
Critical	1	-	-	-	-	-	-	omw (Managem...	12/9/2013 11:53:40 PM	EventID: 0x0000400 (1024) - (NDP...	12/9/2013 7:51:00 PM
Critical	1	-	-	-	-	-	-	omw (Managem...	12/9/2013 11:58:26 PM	EventID: 0x0000400 (1024) - (PMD...	12/9/2013 11:59:00 PM
Critical	1	-	-	-	-	-	-	omw (Managem...	1/22/2014 3:36:26 AM	EventID: 0x0000400 (1024) - (MS9...	1/22/2014 3:37:00 AM
Normal	6	-	-	X	-	-	-	solman	3/28/2014 3:46:04 PM	SAPSPI-402: SOLMAN_MSG:IDoc Err...	3/28/2014 8:30:00 PM
Critical	1	-	-	X	-	-	-	solman	3/30/2014 10:30:01 AM	SAPSPI-406: SAP RFC Function call F...	3/29/2014 11:10:00 PM
Normal	27	-	-	X	-	-	-	solman	4/2/2014 8:12:02 PM	SAPSPI-411: SOLMAN_MSG:Errors in...	1/16/2014 1:00:00 PM
Critical	3	-	-	-	-	-	-	solman	4/6/2014 10:57:00 PM	SAPSPI: Scheduled task failed for "s...	4/5/2014 12:15:00 PM
Critical	8	-	-	-	-	-	-	solman	4/6/2014 11:42:01 PM	SAPSPI: Scheduled task failed for "s...	4/4/2014 11:50:00 PM
Critical	13	-	-	X	-	-	-	solman	4/6/2014 11:54:03 PM	SAPSPI-402: SOLMAN_MSG:High Nu...	3/28/2014 8:30:00 PM
Normal	3	-	-	X	-	-	-	solman	4/7/2014 1:02:01 AM	SAPSPI-402: SOLMAN_MSG:MSSQL ...	4/7/2014 2:02:00 PM
Normal	39	-	-	X	-	-	-	solman	4/7/2014 6:22:01 AM	SAPSPI-408: SOLMAN_MSG:High Pa...	2/7/2014 3:48:00 PM
Normal	544	-	-	X	-	-	-	solman	4/7/2014 6:08:04 PM	SAPSPI-402: SOLMAN_MSG:MaxDB ...	1/12/2014 11:10:00 PM
Warning	5071	-	-	X	-	-	-	solman	4/7/2014 10:48:03 PM	SAPSPI-409: SOLMAN_MSG:High nu...	1/12/2014 4:30:00 PM
Normal	13370	-	-	X	-	-	-	solman	4/8/2014 2:14:03 AM	SAPSPI-410: SOLMAN_MSG:Not Eno...	1/22/2014 6:10:00 PM
Normal	1811	-	-	X	-	-	-	solman	4/8/2014 2:08:06 AM	SAPSPI-402: SOLMAN_MSG:MaxDB ...	1/12/2014 6:40:00 PM

## Event Forwarding from HPOM to BSM

HP SAP Smart Plug-in sends events to HPOM. A simple policy which forwards all events from HPOM to BSM can be used. The policy type is server-based Flexible Management and it is deployed to HPOM Management Server. The alerts are also shown in HP Operations Management (OMi).

**Note:** All events are forwarded to BSM—not only those created by SAP SPI.



```
(read-only) ForwardToBSM [1.0] (Server-based Flexible Management)
File View Help
General
1  TIMETEMPLATES
2  # none
3  RESPMGRCONFIGS
4  RESPMGRCONFIG DESCRIPTION "Forward all messages to OMi"
5  SECONDARYMANAGERS
6  ACTIONALLOWMANAGERS
7  MSGTARGETRULES
8  MSGTARGETRULE DESCRIPTION "Forward all messages rule"
9  MSGTARGETRULECONDS
10 MSGTARGETRULECOND DESCRIPTION "Forward all messages"
11 MSGTARGETMANAGERS
12 MSGTARGETMANAGER
13 TIMETEMPLATE "$OPC_ALWAYS"
14 OPCMGR IP 0.0.0.0 "bsmgw.cloud.internal"
```

There are several additional configuration steps needed to activate this integration. For more information, see the [HP Business Service Management BSM – Operations Manager Integration Guide](#).

## Event Correlation in BSM

This section includes the following topics:

Overview .....	28
Event assigned to CI and HI .....	28
Create and assign additional Health Indicators (if needed) .....	30
Topology view required for TBEC .....	31
KPI Assignment .....	31
Create Correlation rule using TBEC .....	32

### Overview

HP Business Service Management Operations Management module provides added value with a capability called Topology-Based Event Correlation (TBEC). It leverages the insight—on topology and relations between CIs on the one hand, and Health Indicator (HI) values provided by events on the other—to identify and highlight cause/symptom relations between events. Note that those events can originate from different systems or monitoring tools, such as infrastructure monitoring and database monitoring. This allows the operations staff to concentrate on resolving only the cause events, thus increasing the efficiency of data center operations. For more details about TBEC and other event management concepts, see [HP Business Service Management v9.23 Application Administration](#).

The events that are sent from HP SAP SPI through Solution Manager do not provide information about the SAP CI status/health. This can be handled on several levels. This guide provides a specific example for how events can be used to provide the indication of a specific CI health/status, and how this can be used to enhance event investigation and resolution process. Note that this example is only used to clarify the general idea.

### Event assigned to CI and HI

In order to be used in correlation and other advanced event processing capabilities, an event must be related to a specific CI, as well as assigned an HI. Out-of-the-box events sent via HP SAP SPI contain CI hints which allow the event to be mapped to related CIs provided that an appropriate SAP CI was discovered by Universal Discovery and synchronized between UCMDB and BSM.

As for the Health Indicator, there is no out-of-the-box mapping, and this needs to be created manually using the [HP Business Service Management Using Service Health Guide](#) (see page 40).

Taking **SAPSPI-410: SOLMAN\_MSG:High Number of ABAP Short Dumps** as an example for a specific event, we understand that it affects the application performance. Whenever this event is sent, it is an indication of a possible performance problem. In BSM Service Health Admin > Repositories, we create a new Health Indicator **SAPSPI\_Event\_HI** for the appropriate CI type: **SAP ABAP Application Server**, and add to it a new ETI that allows us to map the event to affect this Health Indicator.

Details - SAPSPI\_Event\_HI

General

Name: SAPSPI\_Event\_HI  
 Type: Health Indicator with associated Event Type Indicator  
 Description:  
 Application: Both Service Health and SLM  
 Units:

States

Display Name	Status	Icon
Normal [Default]	Normal	✔
Major	Major	⚠
Critical	Critical	✖

Service Health

SLM

ETI Mapping Rules

Display Name	Event Filter	Map to Indicator State	Active
SAP ABAP General Mapping Rule	SAPSPI Filter	[Mapped by Severity]	true

The rule is for ABAP Application Server CI type and is based on events filtered according to some of the event attributes—for example, **category equals to SOLMAN\_MSG**. It should map the event to our created indicator based on the event severity as displayed below:

**SAP ABAP General Mapping Rule - Edit Mapping Rule**

**General**

ID: 0004966a-164a-48e2-9c8f-513c85d8eac6

\* Display Name: SAP ABAP General Mapping Rule

\* Name: SAP\_ABAP\_General\_Mapping\_Rule

Description:

Active:

**Filter Events**

\* Event Filter: SAPSPI Filter

**Map Event to Indicator**

\* Indicator: SAPSPI\_Event\_HI

Map to Indicator State:  Based on severity  
 Specific Indicator State: <Select an indicator state>

OK Cancel Help

**Note:** The recommended way to map events to Health Indicators is by using ETI hints in the message Policy CMA (custom message attributes) as seen in the [HP Business Service Management Using Service Health Guide](#) (see page 127).

## Create and assign additional Health Indicators (if needed)

Health Indicator specifications should be specified in the teamwork between Operation's personnel and SAP IT experts. This requires consultation with application owners to assess the scope of monitoring and understand the possible impact of specific events.

**Note:** Only events which have significant impact on the function of the service should be mapped to a Health Indicator. This varies across customers and specific applications.

Each monitored CI type should have a list of assigned HIs. For example, an Application Server CI would have a Health Indicator called **Application Service Availability**. This HI can assume the possible values of **Available** and **Unavailable**, which would be mapped to the status **OK** and

**Critical** accordingly, and will receive values from the EUM monitors (BPM/RUM). Performance Health Indicators could be defined more granularly.

## Topology view required for TBEC

In order to enable the calculation of the topology-based correlation rule, we must create a topology view that will include the CI types which can affect other CIs in the topology and in the IT environment. Modify the view properties in Modeling Studio to allow SLM and Service Health bundles.

The guiding questions to ask and answer while doing this are which Health Indicators of a CI could impact other CIs in the view or could be impacted by them? As an example, a memory leak reported on Application Server CI can cause slower transaction processing and negatively affect the performance of Business Application CI that depends on this application server. To describe this, our view should include the Application Server CI, as well as Business Application CI.

## KPI Assignment

In order to reflect the status of the CI as it is reported by an event, we need to define Key Performance Indicators (KPIs) for them. HP recommends using out-of-the-box predefined KPIs for most use cases.

**Note:** Custom KPIs can be created for specific monitoring or reporting needs. For more details, see the [HP Business Service Management Using Service Health Guide](#).

If using existing out-of-the-box KPIs that are already assigned to CI types, we only need to relate Health Indicators from previous steps to those KPIs.

For example:

Define a KPI Assignment. When a condition is filled, KPIs and/or Context Menus are assigned to any CI that meets the condition.

**Assignment Settings**

ID: 3a8e3313-13be-4d85-b307-3bfe2a95a782

\* Name: KPI Assignments for SAP ABAP Application Server

Description: KPI Assignments for SAP ABAP Application Server

**Condition**

**KPI Configurations**

KPI	Calculated Based On	Related Health Indicators	Business Rule
Software Availability	His and child KPIs	SAPSPI_Event_HI	Worst Status Rule
Software Status (custom)	His and child KPIs	R3, SAP ABAP Application Server Status, SAP Ge...	Worst Status Rule

**Context Menus**

## Create Correlation rule using TBEC

Since we have identified dependencies between components in our applications while planning the topology views, we can utilize this understanding to create correlation rules which will mark the cause and symptom CIs to enhance the event-handling process. The main advantage of this method is that it allows identifying cause/symptom relations between events which originate from different monitored domains, such as when a database performance issue negatively affects a transaction's processing rate and affects the user's experience. The topology creates a linkage between the database, application and its monitors, as well as end-user monitoring, and allows the operators to concentrate on the resolution of the source of the problem.

For more information about the concepts behind event consolidation and correlation, see "Introduction to BSM Operations Management > Consolidated Event and Performance Management" on page 10 in the [BSM Operations Manager i Concepts Guide](#).

For technical details about HIs and KPIs, see "Part 1:Service Health" on page 55 in the [HP BSM Application Administration Guide](#).



## Work Mode Management

When monitoring IT services, it is sometimes necessary to suppress events related to specific applications—for example, when the service is taken down for planned maintenance. In the Detect to Correct Value Stream, this is achieved by utilizing the downtime synchronization capabilities.

When planning the maintenance work on a specific service, a request for change (RFC) is created where the user selects the affected CI and a time window when the CI will not be available. Once this RFC is approved, a special integration adapter in SM translates this into a downtime CI in UCMDB. From there, it is pushed as a downtime entity to BSM, thus allowing the Operations Bridge to suppress events for the corresponding CIs no matter what their source might be.

SAP Solution Manager supports the definition of work modes for systems—a configuration which allows suppressing events during planned downtime. To ensure alignment and reporting compliance, there is a need to synchronize downtimes between SAP Solution Manager and BSM.

SAP Work Mode Management allows scheduling the following default work modes via the SAP IT Calendar and must be aligned manually between HP Software and the SAP Solution Manager setup.

- **Planned Downtime**

System is technically down and end users have no access. System administrators can use the planned downtime to execute planned administration tasks that can only be executed during downtime.

- **Maintenance**

System is technically up and end users have no access. System administrators can use the maintenance to execute planned administration tasks that can only be executed during maintenance.

- **Peak Business Hour**

System is technically up and the end users have access. The majority of end users are logged in to the system and load peaks are expected.

- **Non-Peak Business Hours**

System is technically up and the end users have access. The majority of end users are logged in to the system and load peaks are not expected.

- **Non-Business Hours**

System is technically up and the end users have access. The majority of end users are not logged in to the system and load peaks are not expected.

The Work Mode Management application allows planning work modes for technical systems, ABAP or Java instances, databases, log-in groups, or technical scenarios.

There is a need to synchronize the changes in downtime between HP and SAP systems. The exact implementation may vary according to specific customer needs since customers manually implement the processing of maintenance windows and the planned downtime synchronization between SAP Solution Manager and HP BSM and Service Manager. This is done in order to prevent false alerts from monitors when the system is down for planned maintenance, and to make the Service Desk agent aware of the maintenance schedule when handling end-user inquiries.

## BSM forwards events as incidents to SM

This task must be coordinated between engineers implementing BSM and SM. The task is involved with consulting the business application owners to ensure proper alignment of operational event data into SM fields, and facilitating the correct assignment of the incidents according to expertise domains. For example, incidents which are related to DB2 services would be assigned to a database expert's team.

For more information, see the integration documentation for setup instructions. Please note that an out-of-the-box integration automatically assigns all of the incidents to an application's group. This needs to be changed according to the organizational requirements of the customer.

For more information, see the [HP Business Service Management – HP Service Manager Integration Guide](#).

## SM forwards specific incidents to SAP Solution Manager

For configuration instructions, see the [HP Service Manager Exchange with SAP Solution Manager \(SMSSMEX\) v1.10 Users Guide](#). The Detect to Correct Value Stream suggests implementing the use case where the incident begins its life cycle in SM, and it is regarded as a master repository for incidents. For more information, see the [HP Service Manager Exchanges with SAP Solution Manager Installation and Administration Guide](#).

## Incident Exchange

Several use cases can be implemented using the Service Manager to SAP Solution Manager Exchange (SMSSMEX) integration. It allows synchronization between incidents in SM and incidents in the SAP Solution Manager Help Desk module. Detailed instructions for the configuration of this integration are contained in the [HP Service Manager Exchange with SAP Solution Manager Installation and Administration Guide](#). The following section highlights the use of this integration within the context of the HP Detect to Correct Value Stream.

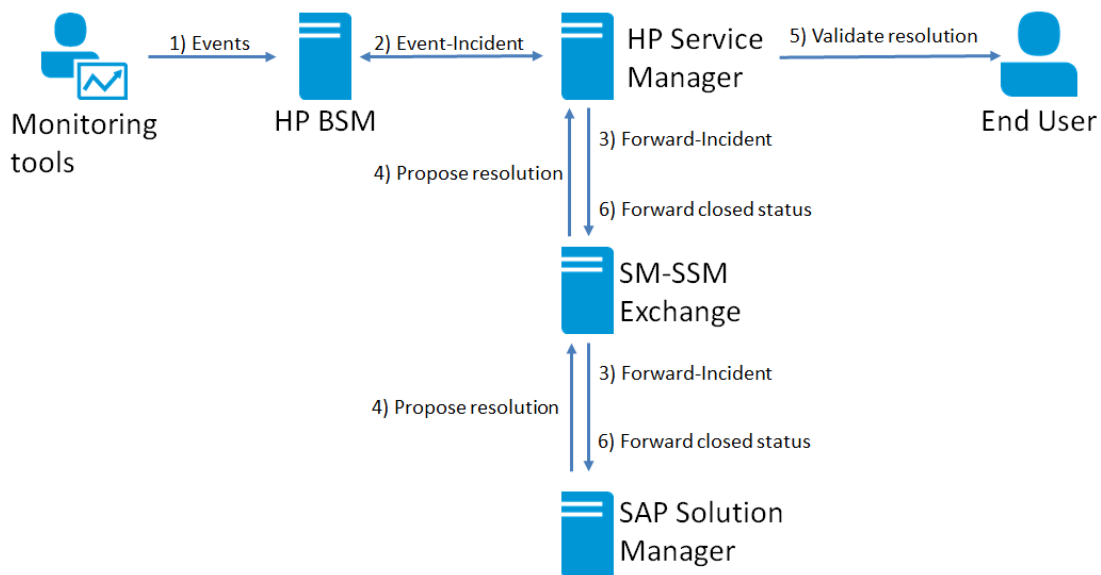
Considering the HP Detect to Correct Value Stream use case, an event which could not be resolved by NOC operators (mostly using OMi Event Browser) is forwarded as an incident to SM where it is assigned to an expert group according to a required area of expertise. SAP Solution Manager Help Desk module enables the user to engage Global SAP Support from within the tool in the context of a specific incident. For such cases, the integration between SM and Solution Manager will be used to transfer the context to Global SAP Support, while retaining an accurate record state for further processing and reports.

The SAP Key User has a lot of knowledge about the customer's SAP environment and has the responsibility to receive all of the service requests from end users. The SAP Key User is provided with an interface to log incidents and service requests to the centralized service desk. The SAP Key User acts as an interface between end users and customers or the service provider support organization.

HP Service Manager, handling the Incident Management process, has a Web API that is used to connect to external applications. A special extension to this API, called SMSSMEX, is used to interconnect SM and SAP. This interface software is the HP and SAP recommended way to integrate SM and SAP Solution Manager Service Desk. However, customers may decide to use a manual or self-made ITIL process-aligned integration with SAP Solution Manager Service Desk functions.

For example, in the following suggested use case, a user issue is captured and sent to SM. Then, according to specific issue details, it is assigned to a particular group of SAP experts according to either the category where the issue belongs or the affected application.

In some cases, SAP experts must use SAP tools to handle the issue. In that case, the issue details must be forwarded to SAP in order to synchronize the details between SM and SAP Solution Manager. Then, either the SAP expert will resolve the issue or the active global support organization will be engaged to resolve the issue.



HP Monitoring tools identify issues with monitored systems (see step 1: Events) and send events to BSM. In some cases, the operations team cannot resolve those issues. Those issues are forwarded as incidents to Service Manager (see step 2: Event-Incident). If the incident is related to SAP, it is forwarded to the Solution Manager Service Desk as a new support message for further processing (see step 3: Forward-Incident). In Service Manager's Incident details, the user is able to see that Solution Manager is currently processing the incident.

When a SAP expert identifies the problem and suggests a solution, the Incident status is set to **Customer Action** or **Proposed Solution** (see step 4: Propose resolution). On the Service

Manager side, communication with the user can take place (see step 5: Validate resolution). If the problem is resolved, the Service Manager Incident is closed and this automatically closes the support message in the Solution Manager Service Desk (see step 6: Forward closed status).

If the solution does not work, the solution is rejected. This automatically reopens the support message in Solution Manager Service Desk for further troubleshooting.

If the incident is not related to SAP, then there is no need to send it to the SAP Solution Manager and it will be fully resolved within SM according to the work flow defined there.

SAP has provided an option to change or update an incident/support message. To avoid a support incident/support message hanging in either SM or Solution Manager, SAP has provided well-defined statuses. In addition, incident/support messages can only be closed/confirmed in the tool where it was originally created. For instance, if the support message was created in SM, then it can only be closed by the user in SM and cannot be closed on the SAP Solution Manager side.

There are more scenarios possible and supported by the HP SMSSMEX integration, if required. For more information, see the [HP Service Manager Exchange with SAP Solution Manager Installation and Administration Guide](#).

## **SM Problems forwarded to ALM as defects (requirements)**

To configure the forwarding of SM problems as ALM defects, see the [HP Service Manager v9.32 Defects and Requirements Exchange between SM/SC and QC/ALM Installation and Administration Guide](#). The out-of-the-box solution offers a limited list of fields to be synchronized that can be extended according to specific customer needs.

If you create a new SAP-related defect in ALM, a corresponding support message is automatically added in Service Desk. If a new support message is created in SM, after the support message is sent, a corresponding defect is added in ALM. Any changes you make to a record in one of the systems is updated in the other system.

## Chapter 5: Abbreviations

ABAP	Advanced Business Application Programming
ALM	HP Application Lifecycle Management
BAPI	SAP Business Application Programming Interfaces
BSM	HP Business Service Management
CI	Configuration Item
CCMS	Computing Center Management System
CMA	Custom Message Attributes
CMDB	Configuration Management Database
CMS	Configuration Management System
CRM	SAP Customers Relationship Management software
D2C	HP Detect to Correct Value Stream
ERP	SAP Enterprise Resource Planning software
EUM	HP Business Service Management's End-User Monitoring
HI	Health Indicator
HP OMi	HP Operations Management
HPOM	HP Operations Manager
HP OO	HP Operations Orchestration
ITSM	IT Service Management
JCO	Java Connector
KM	Knowledge Management
KPI	Key Performance Indicator
LMDB	SAP Landscape Management Database
LVM	Landscape Virtualization Management
MAI	SAP Solution Manager Monitoring and Alert Interface
NIC	Network Interface Controller
PI	Process Integration
RC	HP Release Control

RFC	Request for Change
RTSM	Runtime Service Model
SAP SPI	HP Operations Manager SAP Smart Plug-in
SCM	SAP Supply Chain Management software
SM	Service Manager
TBEC	Topology-Based Event Correlation
SMSSMEX	HP Service Manager Incident Exchange
UCMDB	HP Universal CMDB
UD	HP Universal Discovery

## Chapter 6: Resources

- [HP Detect to Correct Concept and Configuration Guide](#)
- [SAP Software Developer's Network for SAP Solution Manager version 7.1](#)
- [HP Best Practices End-to-End Service Monitoring and Event Management Guide](#)
- [HP Operations Smart Plug-in for SAP v12.00 Installation and Configuration Guide](#)
- [HP Operations Smart Plug-in for SAP v12.05 Printed Online Help](#)
- [SysMon\\_Create custom metrics and alerts in the SAP Community Network](#)
- [SAP Solution Manager](#)
- [Self-Monitoring for the Monitoring and Alerting Infrastructure](#)
- [HP Business Service Management v9.23 BSM – Operations Manager Integration Guide](#)
- [HP Business Service Management v9.23 Application Administration](#)
- [HP Business Service Management v9.13 Using Service Health](#)
- [HP Service Manager Exchange with SAP Solution Manager v1.10 Installation and Administration Guide](#)
- [HP Service Manager Exchange with SAP Solution Manager v1.10 User Guide](#)
- [HP Defects and Requirements Exchange with HP Service Manager/ServiceCenter and HP Quality Center/Application Lifecycle Management v1.03 Installation and Administration Guide](#)
- [HP OO – SAP Integration v1.00.00 SAP Integration Guide](#)

For more information about integrating with SAP Solution Manager, visit the HP Software Support Online Web site at: <http://www.hp.com/go/hpsoftwaresupport>

## Additional Online Resources

**Troubleshooting & Knowledge Base** accesses the Troubleshooting page on the HP Software Support web site where you can search the Self-solve knowledge base. Choose **Help > Troubleshooting & Knowledge Base**. The URL for this web site is <http://h20230.www2.hp.com/troubleshooting.jsp>.

**HP Software Support** accesses the HP Software Support web site. This site enables you to browse the Self-solve knowledge base. You can also post to and search user discussion forums, submit support requests, download patches and updated documentation, and more. Choose **Help > HP Software Support**. The URL for this web site is [www.hp.com/go/hpsupport](http://www.hp.com/go/hpsupport).

Most of the support areas require that you register as an HP Passport user and sign in. Many also require a support contract.

To find more information about access levels, go to:  
[http://h20230.www2.hp.com/new\\_access\\_levels.jsp](http://h20230.www2.hp.com/new_access_levels.jsp)

To register for an HP Passport user ID, go to:  
<http://h20229.www2.hp.com/passport-registration.html>.

**HP Software Web site** accesses the HP Software Web site. This site provides you with the most up-to-date information on HP Software products. This includes new software releases, seminars and trade shows, customer support, and more. Choose **Help > HP Software Web site**. The URL for this Web site is [www.hp.com/go/software](http://www.hp.com/go/software).

**HP Software Solutions Now** accesses the HPSW Solution and Integration Portal Web site. This site enables you to explore HP Product Solutions to meet your business needs, includes a full list of Integrations between HP Products, as well as a listing of ITIL Processes. The URL for this Web site is <http://support.openview.hp.com/sc/solutions/index.jsp>.