OZSoft Consulting Corporation
http://www.ozsoft-consulting.com

SAP Management Pack for Microsoft System Center Operations Manager

Installation and User's Guide

Version 4.0.0 December 15, 2014

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About this publication

This book provides instructions for installing, configuring and operating OZSoft SAP Management Pack for Microsoft System Center Operations Manager.

Introduction

OZSoft SAP Management Pack for Microsoft System Center Operations Manager (SCOM) enables SAP Environments management through the power and flexibility of SCOM.

SAP provides a powerful, built-in system monitoring and notification facility called Computer Center Management System (CCMS). CCMS represent a standalone approach and does not allow for seamless integration into existing enterprise wide Service Management environments. SCOM on the other hand is one of such Service Management platform.

If your organization has standardized on SCOM as the management platform you should consider the benefits of integrating your SAP alerts and performance metrics. SAP Management Pack for SCOM opens up such possibility.

The Management Pack does not require any additional software besides SCOM and SAP CCMS.

Architecture

The SAP Management Pack is intended for monitoring SAP ABAP Infrastructure. The Management Pack is designed as a "Connector" utilizing SCOM SDK and includes the Windows installable SAP Connector plus a set of passive Management Pack implementing the SCOM Classes, Monitors and Rules. This approach minimizes performance impact on SAP while achieving the high deployment flexibility and the ease of administration.

The diagram below illustrates how the Management Pack fits into SCOM Architecture.

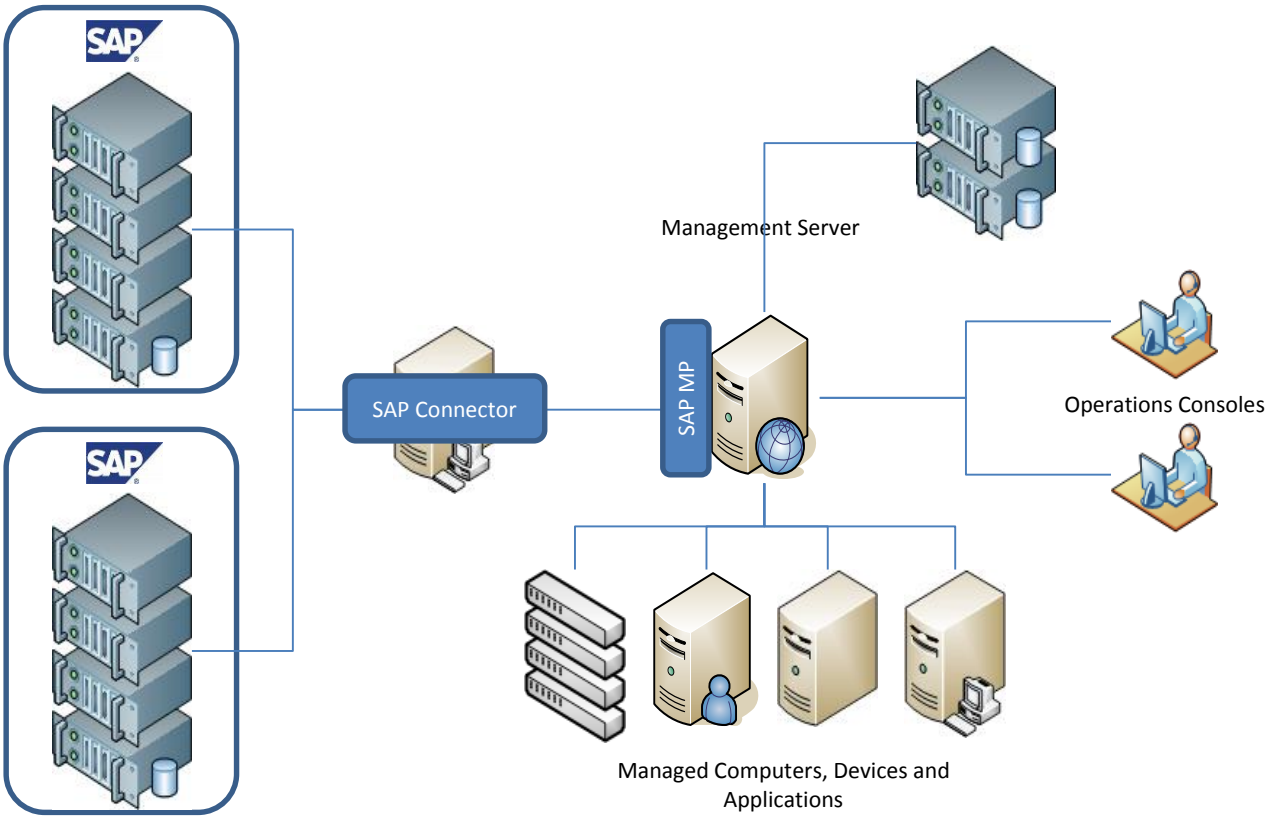


Figure 1. Management Pack Architecture

Management Pack SAP Connector

Management Pack **SAP Connector** is installed on one or more computers and connects to SAP via RFC, utilizing SAP .NET Connector and to SCOM via SCOM SDK.

The connector communicates with SAP utilizing a set of XMI (eXternal Management Interface) Function Modules, specifically XAL, XMB and XBP interfaces and is fully compliant with SAP integration requirements

The connector performs discovery and periodic CCMS Alert and Metrics retrieval utilizing SCOM SDK and Operations Manager Connector Framework to update SCOM DB.

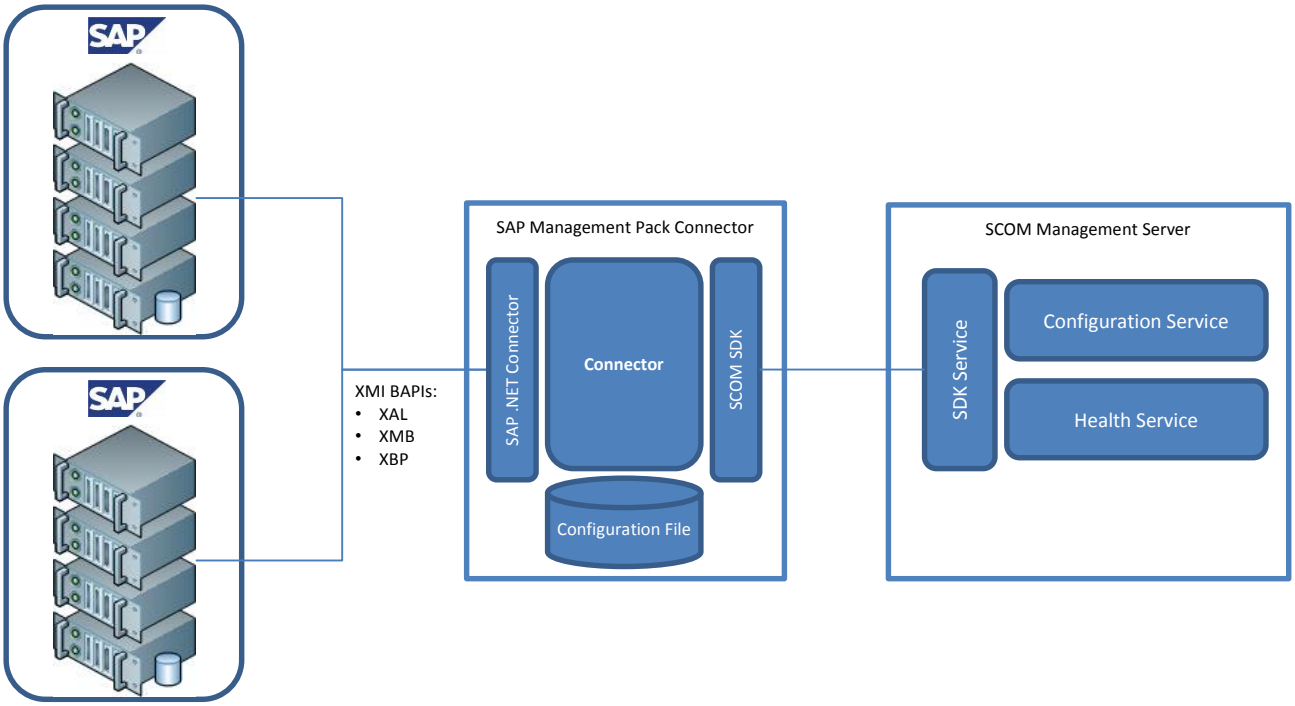


Figure 2. SAP Connector Interfaces

Installation requirements

Host OS

- Windows Server 2008 R2 64-bit or 2012 (R2) updated to the latest Service Pack.
- .NET Framework 4.0 or later

Microsoft System Center Operations Manager

Microsoft System Center Operations Manager 2007 SP1, Microsoft System Center Operations Manager 2012

SAP

SAP System Kernel 7.0 or later

For each SAP system an SAP account needs to be defined. The user can be either Dialog or Service type.

The following authorizations are required for the Management Pack to run properly:

Auth Object	Values	Reason
S_RFC	RFC_TYPE=FUGR RFC_NAME=(PWP2, RFC1, RFC2, SDDO, SDIFRUNTIME, SG00, SRFC, SYST, SYSU, SIFD, SIMG, SDNT, SALX, SXSP, SXMI, SXMB, SXBP, STUB, RFC_METADATA, PERF_TRA_DIA, RSPC_API, ECATT_EXECUTE, ECATT_LOG) ACTVT=16	RFC Calls
S_XMI_PROD	INTERFACE=(XAL, XMB, XBP) EXTPRODUCT=MP4SCOM EXTCOMPANY=OZSoft	XMI Function Calls
S_RZL_ADM	ACTVT=03	CCMS Rule Based Monitors
S_BTCH_JOB	JOBACTION=(LIST,SHOW) JOBGROUP=*	Background Job Monitoring
S_BTCH_ADM	BTCADMIN=Y	Cross-client Background Job Monitoring

Table 1. SAP Authorizations

Installing Management Pack

Upgrading Management Pack Connector

When upgrading to the higher version of the Management Pack the current configuration, which includes SAP systems connection parameters, is preserved. However we strongly recommend that you back-up the configuration file *<Installation Folder>\conf\CONFIG.XML* before you start the upgrade. Later you can restore it if the configuration has been lost.

Install Management Pack Connector

On a Windows Server computer run the supplied ***sapmp4scom.msi*** file.

The following windows will appear:

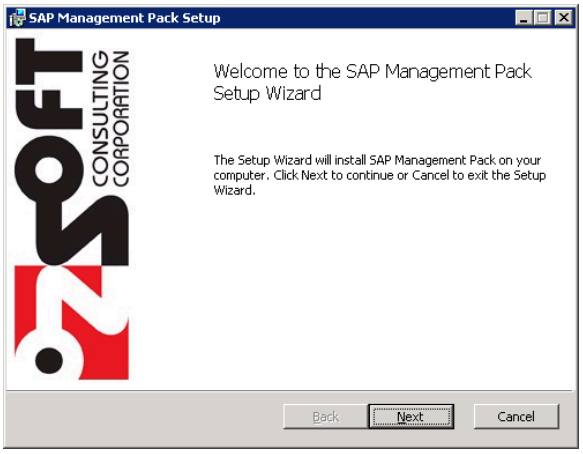


Figure 3. Installation Start

Click *next* to start the installation.

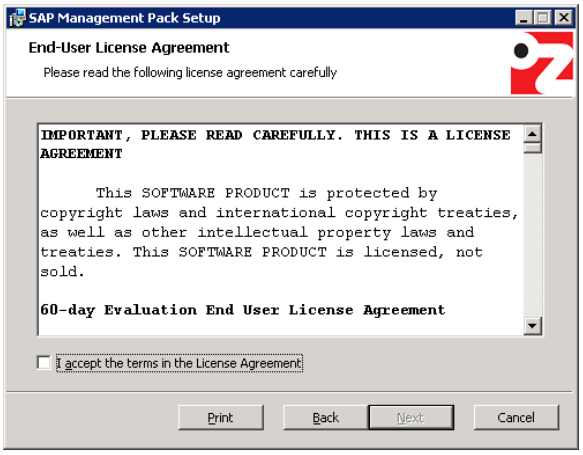


Figure 4. Installation License Agreement

Accept End-User License Agreement and click *next*.

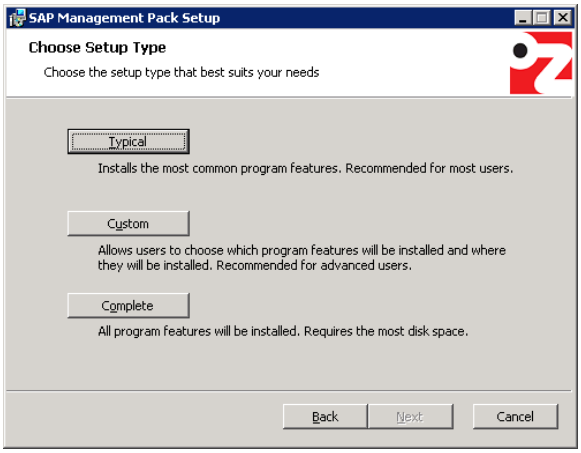


Figure 5. Installation Types

Choose Installation type and click *next*.

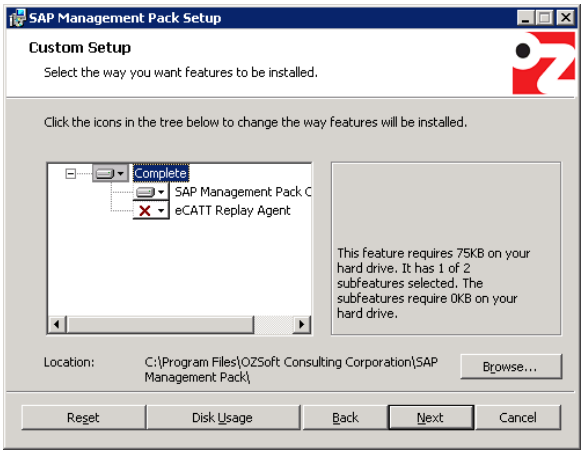


Figure 6. Installation Components Selection

Select the components to install and change the installation path if desired and click *next*.

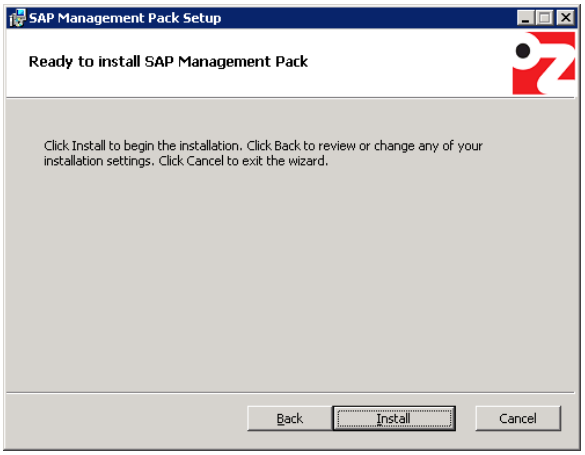


Figure 7. Installation Confirmation

Click *Install* to continue

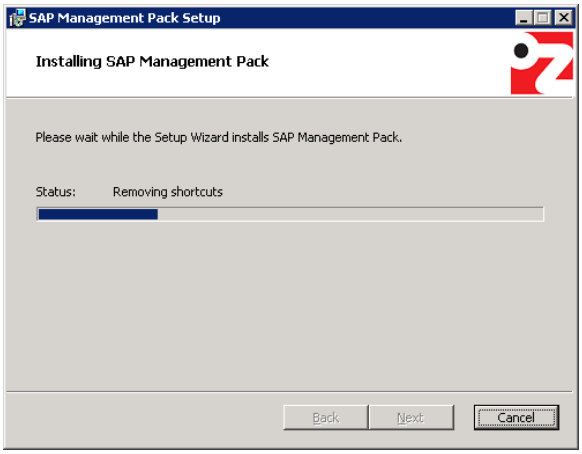


Figure 8. Installation Progress

Wait for installation to complete – the following window will appear:

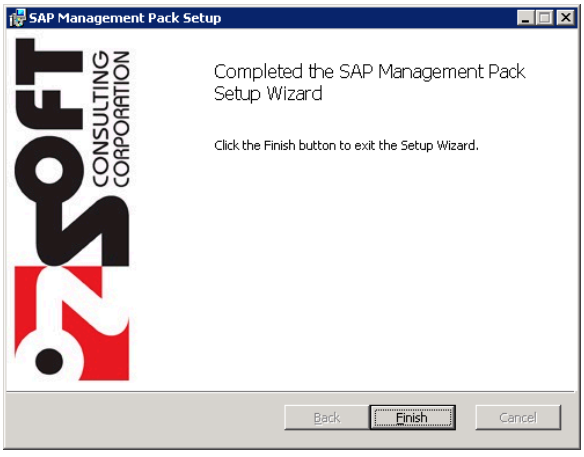


Figure 9. Installation Complete

You have successfully completed the Management Pack Connector installation.

Change Management Pack Connector

If there is a need to install/remove Management Pack components use *Programs and Features* control:

Navigate to *Control Panel\All Control Panel Items\Programs and Features*:

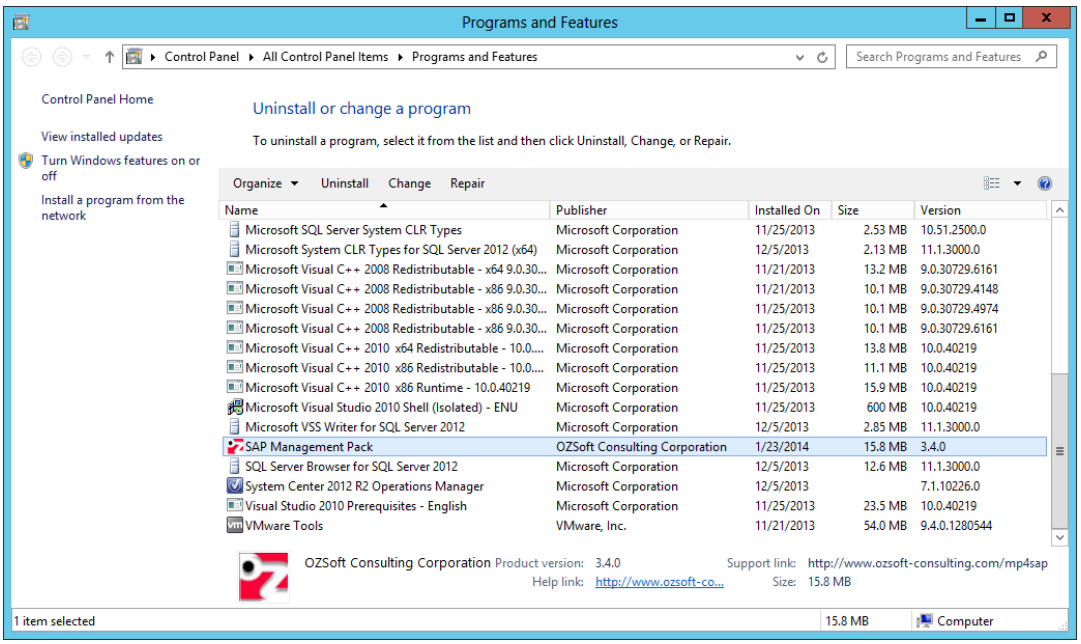
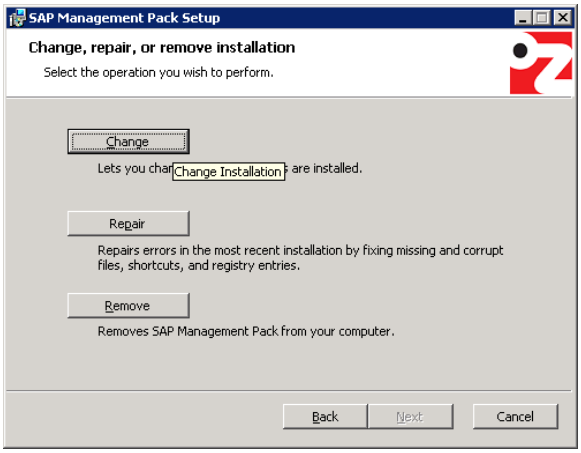
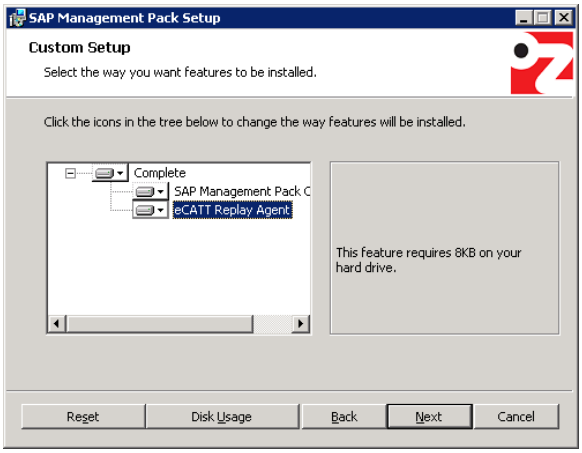


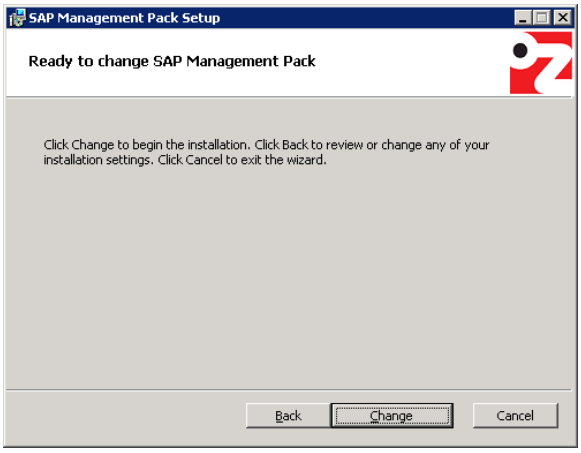
Figure 10. Programs and Features

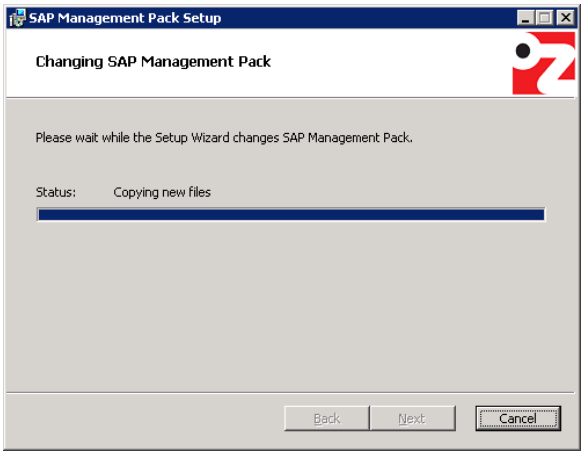
Locate SAP Management Pack product and right-click on the record, select *Change* in the popup.

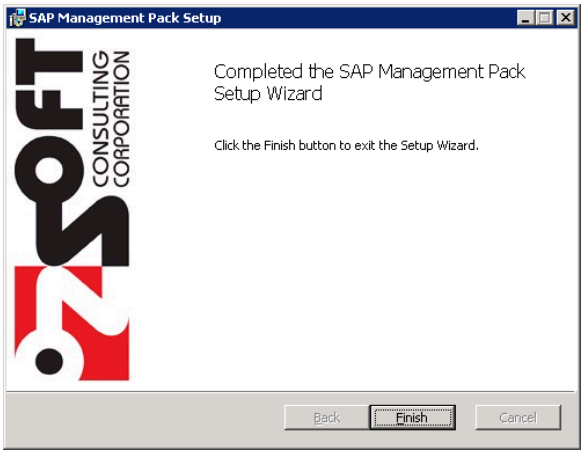
Follow the installation screens to select the components to be added/removed:


SAP Management Pack Setup
Change, repair, or remove installation
Select the operation you wish to perform.
Change
Lets you change how SAP Management Pack is installed.
Change Installation
Repair
Repairs errors in the most recent installation by fixing missing and corrupt files, shortcuts, and registry entries.
Remove
Removes SAP Management Pack from your computer.
Back
Next
Cancel


SAP Management Pack Setup
Custom Setup
Select the way you want features to be installed.
Click the icons in the tree below to change the way features will be installed.
Complete
SAP Management Pack
eCATT Replay Agent
This feature requires 8KB on your hard drive.
Reset
Disk Usage
Back
Next
Cancel


SAP Management Pack Setup
Ready to change SAP Management Pack
Click Change to begin the installation. Click Back to review or change any of your installation settings. Click Cancel to exit the wizard.
Back
Change
Cancel





Importing Management Pack into Operations manager

In the installation folder (C:\Program Files\OZSoft Consulting Corporation\SAP Management Pack) find *scom* sub-folder. In this folder you will find OZMP4SAP.mp and other MP files.

Import these files into SCOM using Operations Console:

1. Open Operations Console
2. In the Navigation Pane switch to ***Administration*** view.
3. Select management Packs node in the Navigation Pane Tree.

4. Click on Import Management Packs link in the Action Pane

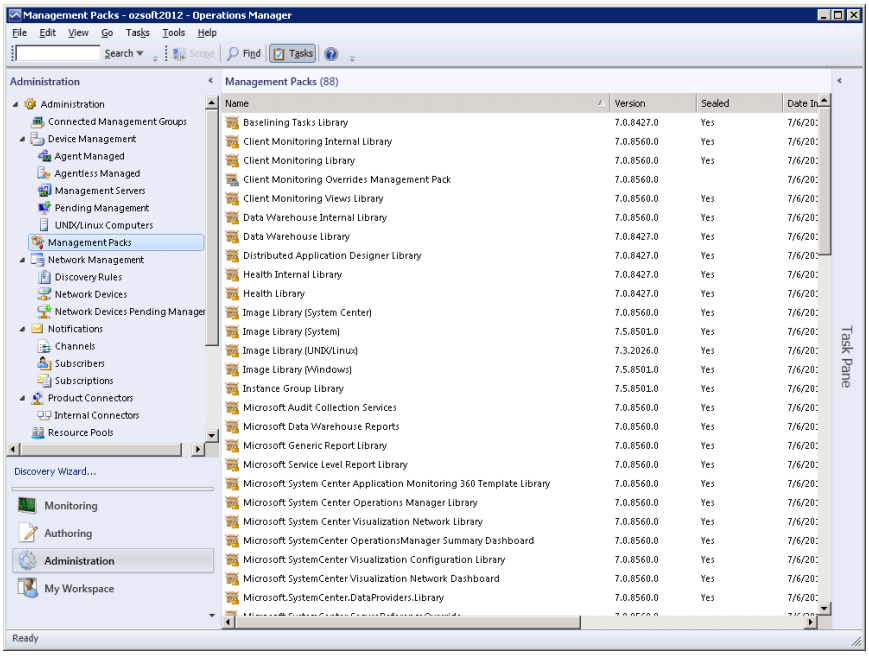


Figure 11. Importing Management Pack

5. Select Management pack files from*<Installation Folder>\scom* folder:

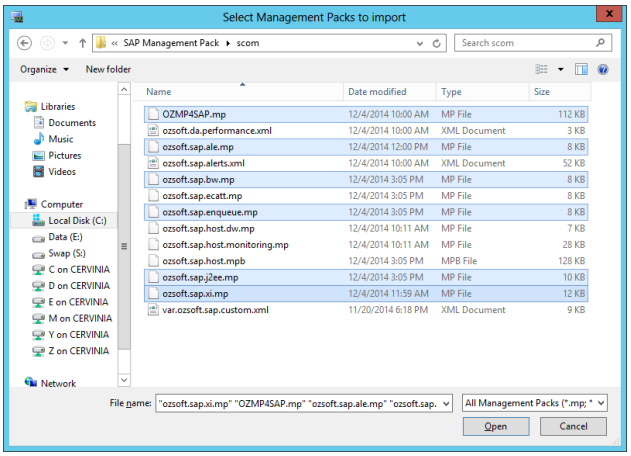


Figure 12. Select Management Pack files

6. Import the Management Packs
7. You have completed the installation.

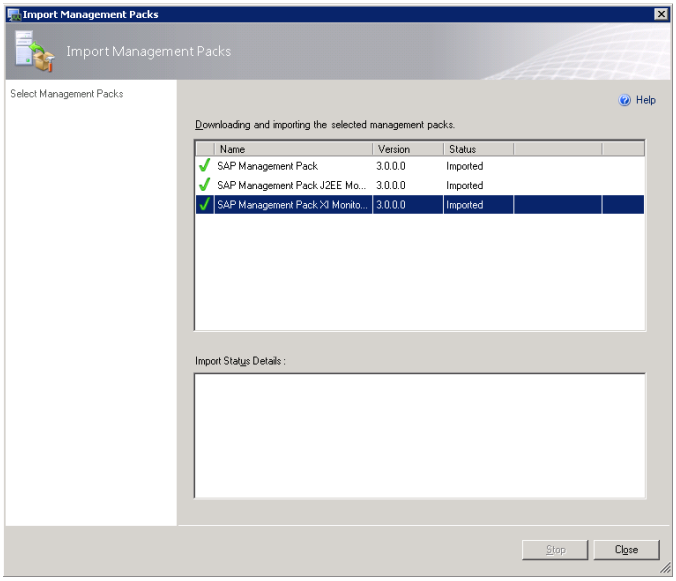


Figure 13. Importing Management Packs - Import Complete

In order to enable CCMS-based ALE, BW, Enqueue, J2EE and XI Monitoring the corresponding Add-on Management Packs need to be imported into SCOM in addition to the core SAP Management Pack.
The management pack files are located in *<Installation Folder>\scom.*
If imported separately, please repeat steps 1-7 for all *ozsoft.sap.<component>.mp* files.

Configuring Management Pack

Now you are ready to configure the management pack.

Before you begin please consult your SAP Basis administrator on the acceptable connection method for each SAP system you are planning to connect to.

After the Management Pack was installed successfully, a program menu is created at Programs->OZSoft Consulting Corporation->SAP Management Pack->SAP Management pack Configuration. Click on it to launch the Management Pack Configuration.

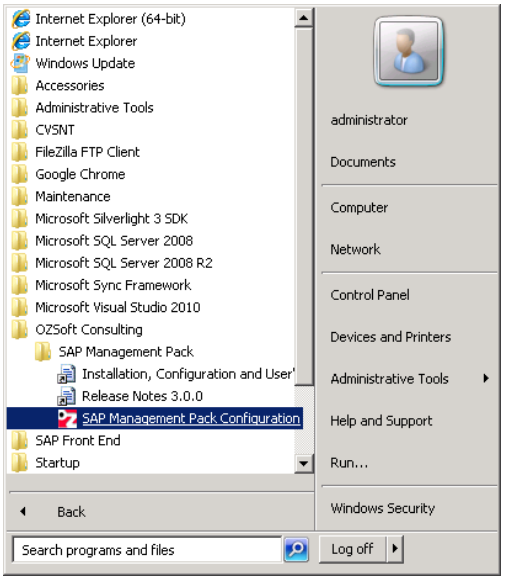


Figure 14. Configuration Utility – Launch

Configuration utility window will appear

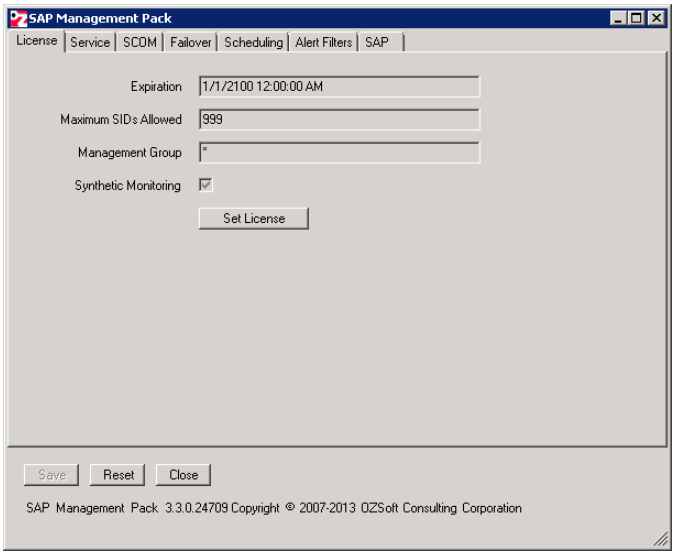


Figure 15. Configuration Utility - Main Window

License

The 60-day evaluation license is installed automatically. It allows for only one (1) SAP System connection.

If you have obtained a license key from OZSoft you can install it by pressing “Set License” button.

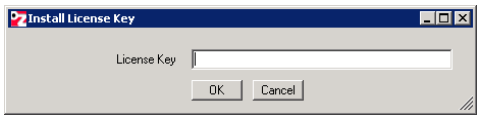


Figure 16. Set License Key

Service Control

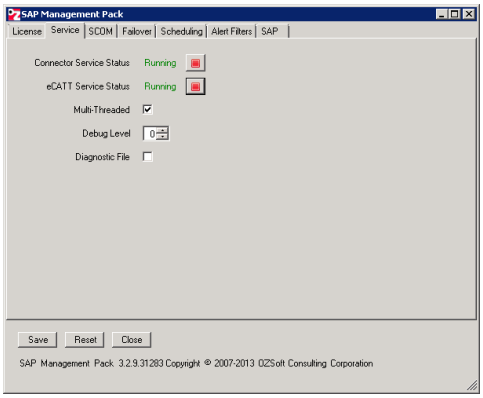


Figure 17. Service Control

You can start and stop SAP Connector and eCATT Replay Agent Services (whatever services are installed) from this tab.

Multi-Threaded - start a separate thread for each configured SAP system

Debug Level – the value can be between 0 and 5, with 0 producing minimal diagnostics and 5 the most detailed diagnostics. Consult with OZSoft support for exact values based on the diagnostics requirements.

Diagnostic File – write all diagnostic to the file:***<Installation Folder>\log\DIAG_<yyyyMMddHHmmss>.txt*** where <yyyyMMddHHmmss> is the time the connector has started

Operations Manager Configuration

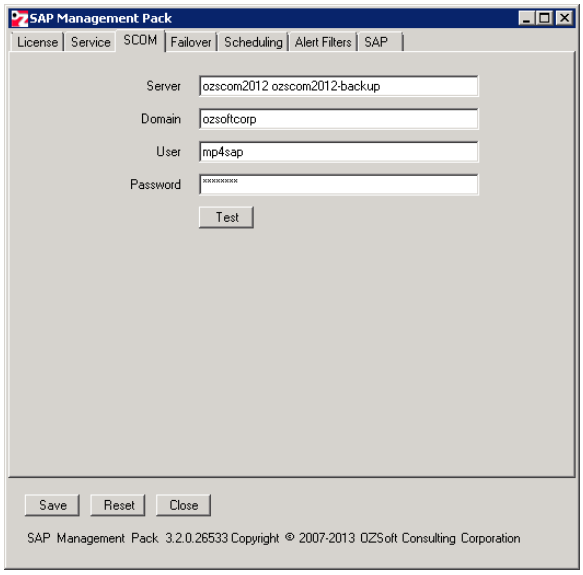


Figure 18. System Center Connection Parameters

There are several approaches for configuring Operations Manager Connection:

1) If you have installed the Management pack on SCOM Root Management Server (RMS) you can only specify the local server name and leave the rest of the parameters blank
2) If you installed the Management pack on a computer which is a part of the same Windows domain as the SCOM RMS you need to provide at least the SCOM RMS server name in the Server field.
   You need to choose the identity for MP Connector. The user you are choosing has to be assigned the Administrator role within SCOM.
   When setting the credentials you have two options:
   a. Change the Management Pack Windows Service Log On parameters:
      i. Open Services Panel
      ii. locate "OZSoft SAP Management Pack" service
      iii. click Properties
      iv. switch to Log On tab
      v. set the desired credentials
      vi. Click OK to save
   b. Store the credentials in the Management Pack configuration file (the password is encrypted). To do this just provide the values for the rest of fields in the SCOM tab of configuration utility
3) The Server field can contain comma or space-separated list of Management Server host names. The Connector Service will attempt to connect to each server on the list until successful.

Failover

The Management Pack has built-in Failover support for High Availability setups:

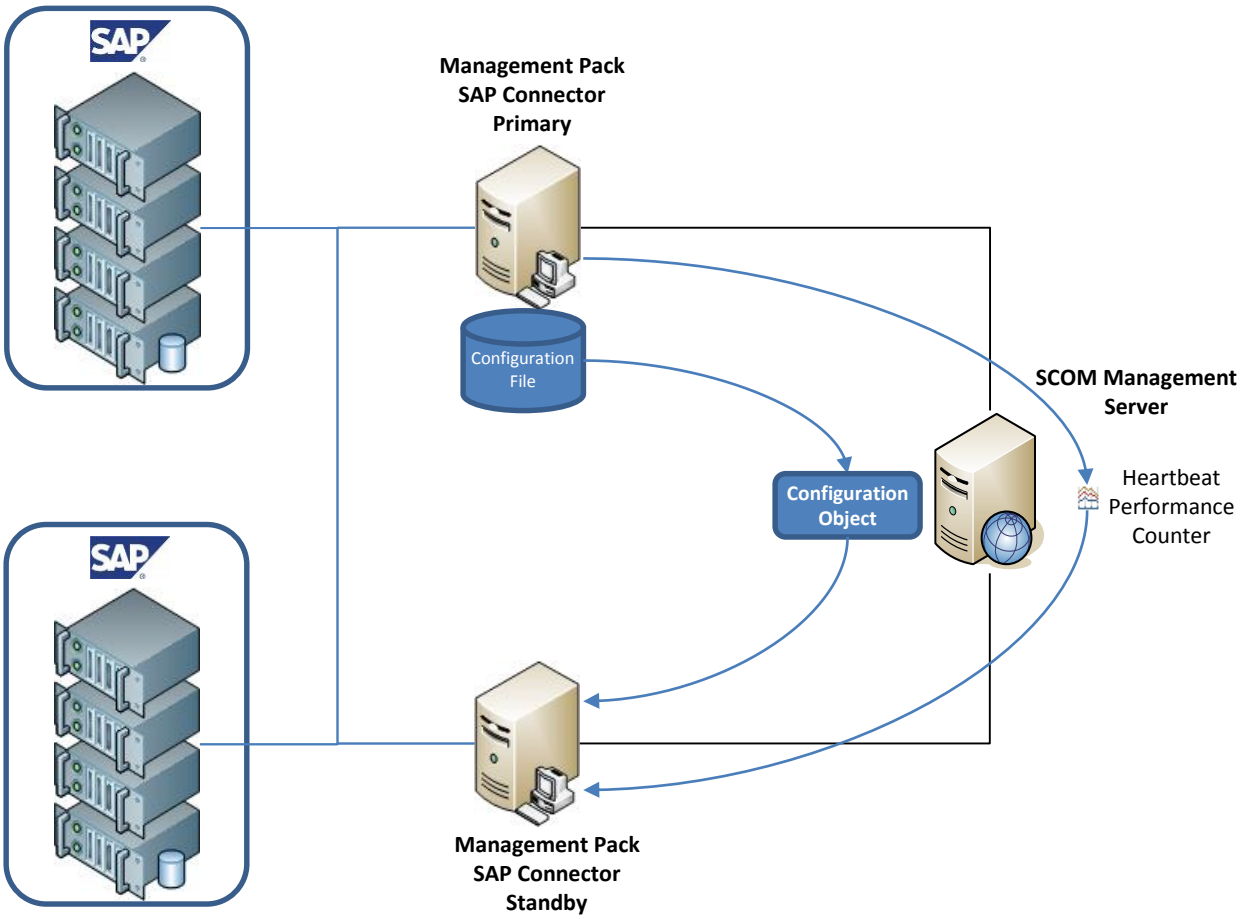


Figure 19. Failover Architecture

The SAP Connector installation can be configured as a Primary, a Standby, Primary & Standby or a Standalone instance.

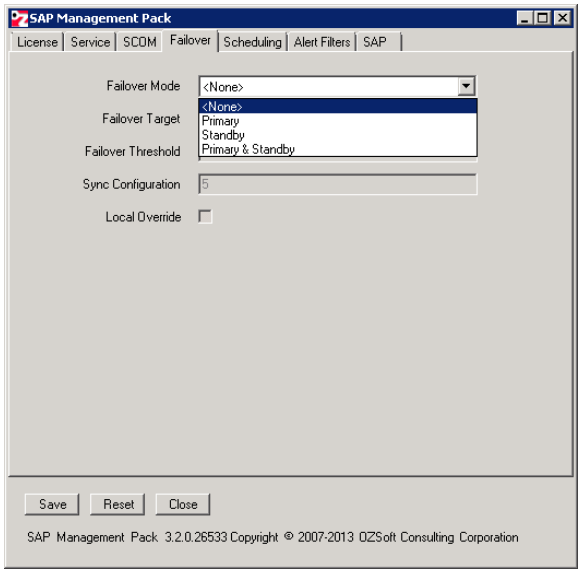


Figure 20. Failover Configuration

When <None> is chosen –the failover functionality is disabled, the management pack will behave as a Standalone instance.

Primary Mode

The Primary instance performs 2 additional operations:

1) Posts Heartbeat counter associated with SAP Connector Object in SCOM.
2) Periodically synchronize any changes made to the active SAP connection configurations with the configuration object associated with each SCOM SAP System object. The synchronization interval parameter **"Sync Configuration"** allows for a fine control of how often the synchronization is performed or not at all (-1 value).

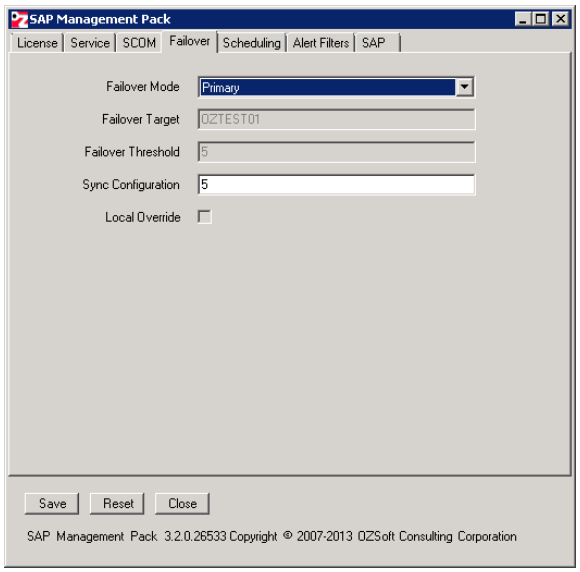


Figure 21. Failover Primary Mode

Standby Mode

The Standby instance checks once a minute if the heartbeat posted by the Primary instance on the machine designated in **Target** field is older than the specified threshold (in minutes).

The **Target** field contains a Regular Expression allowing for failover of all matching machines; the empty **Target** means any Primary instance.

If the heartbeat age is below the threshold, the Standby instance skips the particular Primary instance and goes back to sleep. If the instance heartbeat age is above the threshold, the Standby instance first attempts to read the SAP configuration object associated with a specific Primary instance and if successful - uses the properties to connect to the SAP system, performing all retrieval operations that are due for the execution.

The Management Pack allows for a local override of SAP connection(s) configuration on Standby instances. **Local Override** option when checked ensures that the values specified in the local SAP connections(s) configuration take precedence over the values synchronized with the Primary instance.

No additional configuration of SAP Connections for the Standby instance is required.

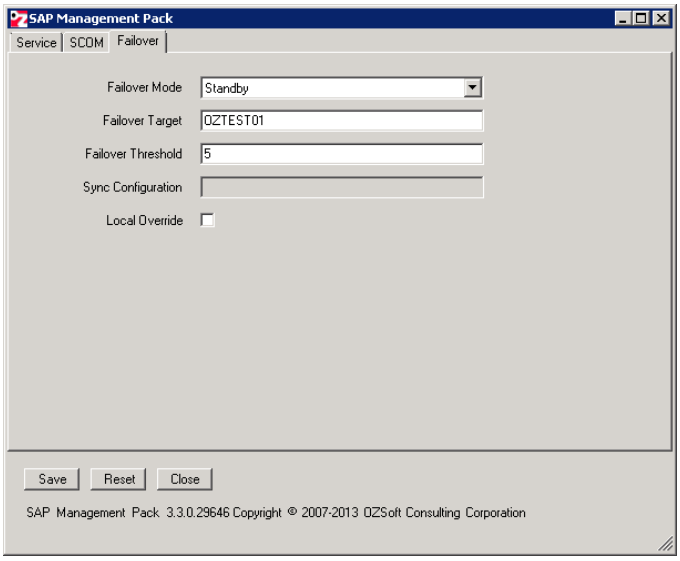


Figure 22. Failover Standby Mode

When the Standby instance becomes active it posts an SAP Connector warning event indicating that it is now active (an Alert is generated by default).

When the Primary instance (or all of them if **Target** filed is left blank) resumes operation, the Standby instance goes back into the Standby mode.

There could be multiple Standby instances that will perform failover based on Target field value or if the Target left blank - on the first-come basis.

License Key Synchronization

For Standby instances, there is no need to install a license key – the key is automatically synchronized with the Primary Connector Instance.

Primary & Standby Mode

In this mode the Instance acts as both Primary and a Standby for specified Target (or all other) primary instance

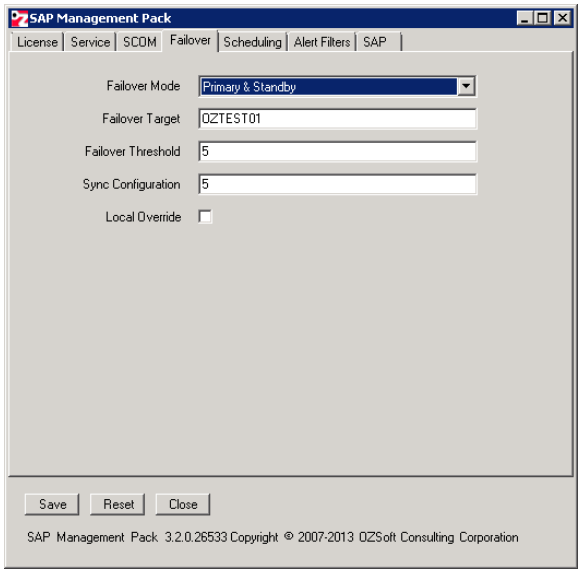


Figure 23. Failover Primary & Standby Mode

Scheduling

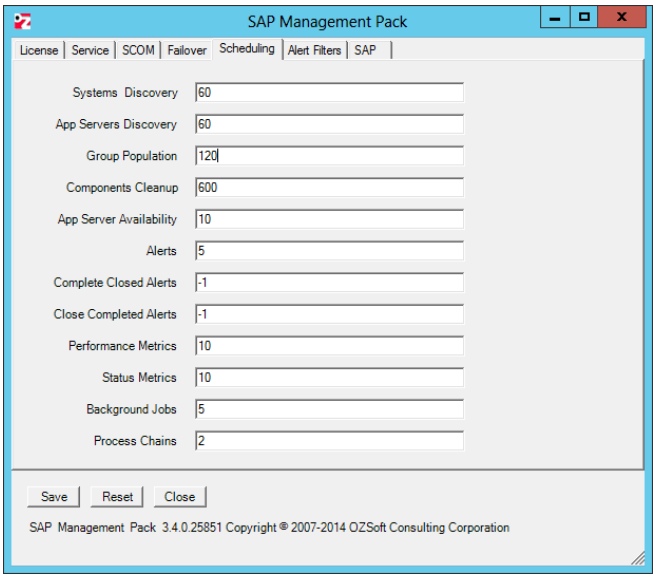


Figure 24. Scheduling Parameters

Scheduling parameters control the frequency (in minutes) of the data retrieval from SAP system(s). The minimum effective value is 30 seconds as this is the SAP Connector service wakeup interval. Specifying a negative value will disable the category collection.

Alert Filters

The SAP Management Pack integrates with SAP via CCMS External Alert Management interface, which is based on CCMS Monitors (administered with RZ20 transaction). The CCMS Monitors are, in essence, filters that define what Alerts and Performance Counters the MP retrieves from CCMS. With the CCMS Monitors properly defined – only the relevant alerts are

forwarded to SCOM. Configuring the CCMS Monitors however is relatively complicated and requires SAP expertise. In the Management Pack the **Alert Filters** define exclusion criteria for the alerts across the connected SAP systems - after the alerts are retrieved from SAP they are matched to the filters and if an alert matches to one of the filters, the alert is discarded (OR logic).

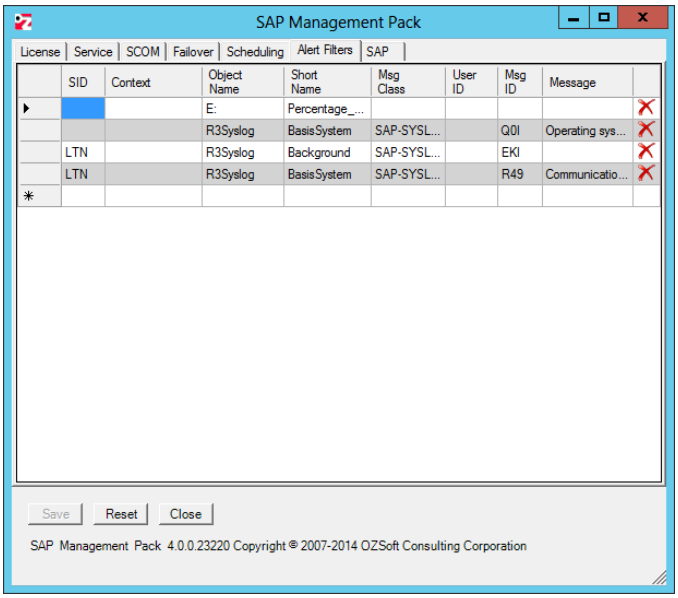


Figure 25. Alert Filters

You can use full REGEX (Regular Expression) Syntax in each of the filter fields. Only the fields with the non-empty values are evaluated. All specified fields have to match in order for the filter to be effective (AND logic)

SAP Systems

Switch to ***SAP*** Tab to configure SAP System connections

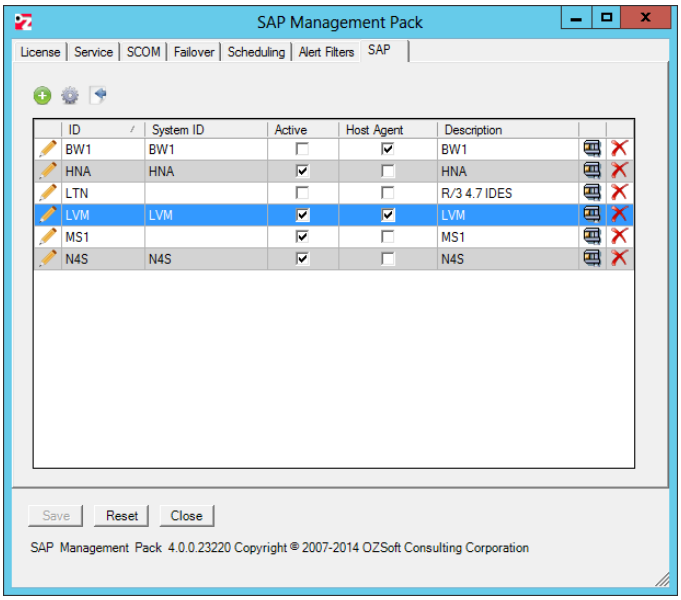


Figure 26. SAP System Configurations

To add a new SAP configuration click ***(New)*** button in ***SAP System*** tab - a new dialog window will appear:

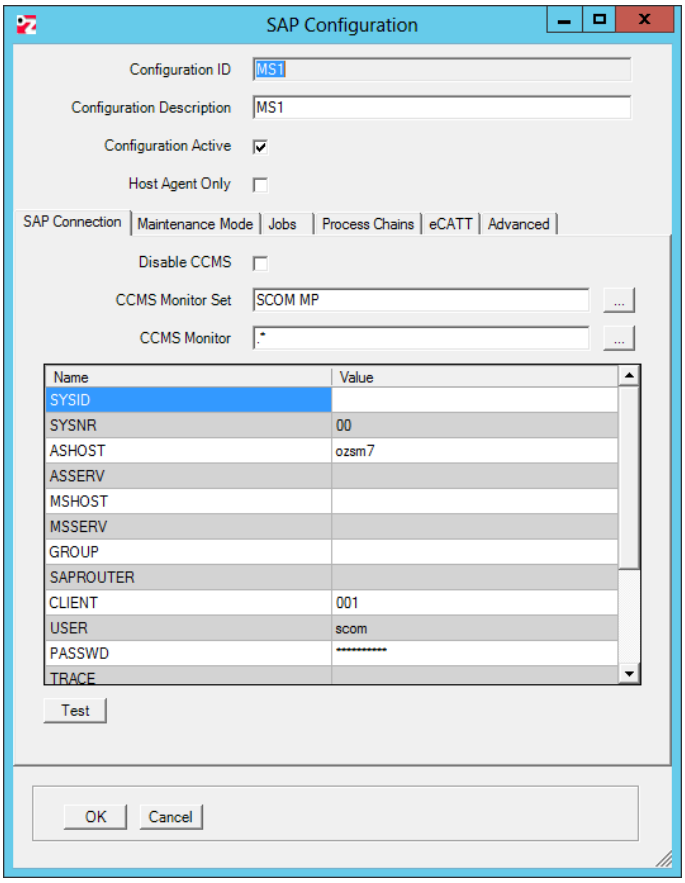


Figure 27. SAP Configuration

Specify a Unique Configuration ID (can't include special characters like '<','>','#','&')

Check ***Configuration Active*** checkbox to activate SAP System configuration. Only active configurations are counted towards licensed system limit)

! If you intend to add an SAP System monitored via Host Control only – check ***Host Agent Only*** box, otherwise leave the box unchecked

SAP Connection Parameters

Consult your SAP Basis Admin to obtain SAP Connection Properties as well as the ***Monitor Set*** and ***Monitor*** names.

For supported Connection Properties please refer to *Appendix A*

CCMS Collection can be disabled by checking the box ***Disable CCMS.*** When CCMS Collection is disabled - only System and Application Server Availability is collected from SAP, Monitor Set and Monitor fields are disabled.

The Monitors are configured in SAP using RZ20 transaction. You choose what metrics to monitor, what alerts to capture, what App servers to include in the SAP Monitor using RZ20 as well.

The ***Monitor*** field can contain a pattern which is used to select Monitors within the Monitor Set. This way it is possible to combine data (alerts and performance metrics) from multiple Monitors simplifying the configuration on the SAP side. The pattern is a **Regular Expression** (REGEX). For example: ".*" matches any number of any characters, including none; "." matches

any single character etc. For more options please refer to REGEX reference http://www.regular-expressions.info/reference.html. Please note that the pattern matching is **not** case sensitive ("^ABC$" matches "abc").

You can also select from the existing Monitors and Monitors Sets by pressing the "…" buttons next to each field. Select the ***Monitor Set*** first and then the ***Monitor.***

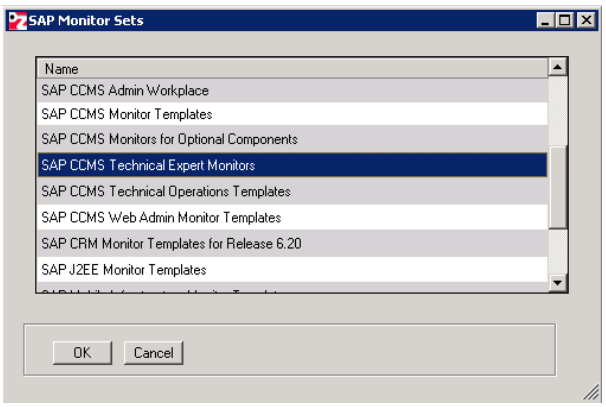


Figure 28. Selecting CCMS Monitor Set

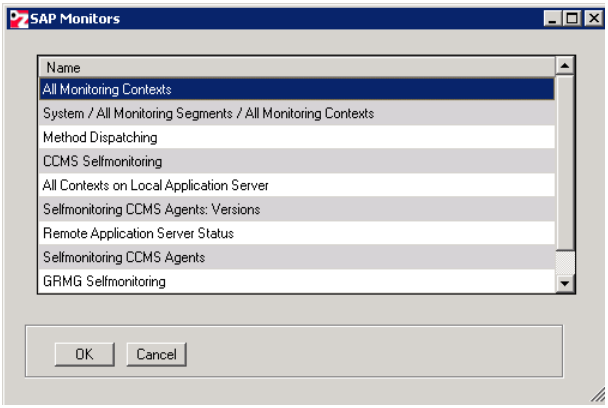
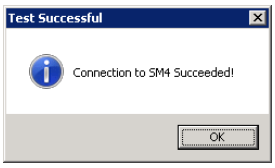


Figure 29. Selecting CCMS Monitor

! ***Monitor Set*** and ***Monitor*** Selection only works if the **SAP Connection Parameters** are configured and the user is assigned all required authorizations as described in **Error! Reference source not found.**

In the **SAP Connection Parameters** set the value that you obtained from your Basis Admin earlier.

When all required attributes are filled in, the ***Test*** and ***OK*** buttons are enabled. Pressing on the ***Test*** button initiates a test. If connection is established successfully the following message will appear:



If for some reason the connection fails the message will appear indicating the reason for the failure:

Figure 30. SAP Connection Error

When the test has completed successfully, click ***OK*** to return to the main window.

In the main window click ***Save*** to save the configuration to the file.

In the situations when it is impossible to establish the connection to SAP interactively (firewall security settings for example) you can skip the Test stage and save the configuration as is. You will need to watch for the events in SAP/SAP Connector indicating Failed Logins etc.

Background Job Monitoring

SAP Management Pack, in addition to the integration with CCMS Background Job Monitoring (see Appendix C in the Installation and User's Guide) implements built-in Background Job Monitoring that does not rely on CCMS and allows for improved functionality and flexibility.

The built-in Background Job Monitoring exploits SAP External Background Processing (XBP) interface and requires a direct connection to SAP systems (Solution Manager can't be used to monitor jobs on the satellite systems).

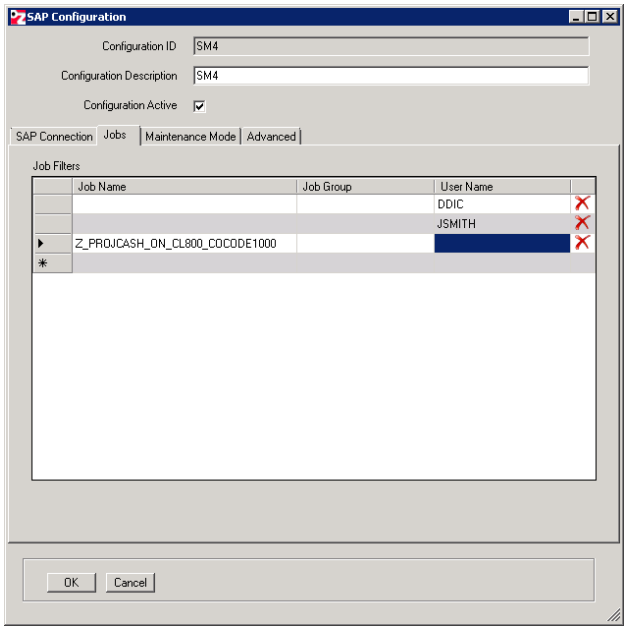


Figure 31. Background Jobs Filters

While defining the Job Filters you can include wildcard "*"; leaving the fields blank is equivalent to the value of "*". At least one field needs to be specified.

BW Process Chain Monitoring

SAP Management Pack supports BW Process Chain Monitoring. This functionality is supported for directly connected SAP systems and exploits BW RSPC APIs

Process Chain Monitoring configuration is located in *Process Chains* tab in the SAP Configuration window.

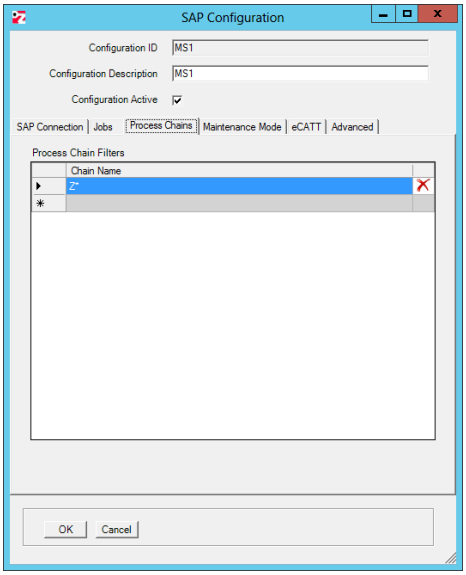


Figure 32. Process Chain Monitoring Configuration

The Process Chain monitoring interval is configured in Scheduling tab (Process Chains field) and determines how often the Connector retrieves and analyzes the process chains:

Requirements

On BW system version before SAP_BW 701 please make sure the appropriate SAP Support Packages are imported according to SAP Note 1080558 - *Module RSPC_API_CHAIN_GET_RUNS does not exist*

SCOM Maintenance Mode Scheduling

Maintenance Mode scheduling configuration is located in ***Maintenance Mode*** tab in the SAP Configuration window.

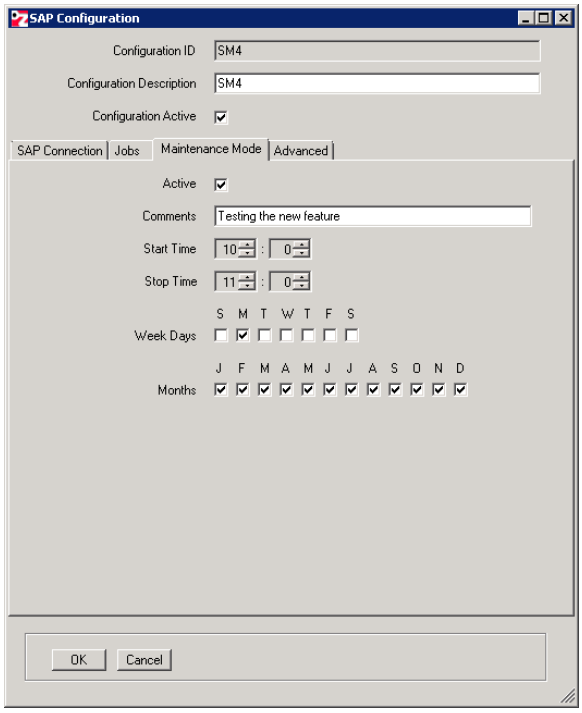


Figure 33. SCOM Maintenance Mode Scheduling

Enable Maintenance Mode scheduling by checking ***Active*** checkbox.

Specify ***Comments*** – this will appear in SCOM Maintenance Mode comments field.

Choose time interval in ***24 hour*** format

- ! ***Stop Time*** can be "earlier" than ***Start Time*** in which case it is assumed to be on the next calendar day.

Choose Week Days and Months the Maintenance Mode to be on.

Click ***OK*** button.

- ! The Management Pack Connector will try to schedule a Planned Maintenance Mode at the specified time interval for the SAP System Object and all its descendants. If at this time the SAP System Object is already in Maintenance Mode, the connector will try to calculate the required time interval after the current Maintenance Mode is scheduled to end and if necessary schedule Maintenance Mode for the reminder of the time interval.

CCMS Alert Back-scan interval

When the Management Pack is connected to an SAP Central Monitoring System (CEN) there is a possibility of a delay between the time the alerts are generated on the satellite system and the time they are pulled into the CEN. This can cause the alerts to be missed by the Management Pack since it only retrieves the alerts generated since the last run and alerts are time-stamped as generated on the satellite system. To mitigate this situation a Back-Scan interval parameter is introduced. Back-Scan interval (seconds) is subtracted from the retrieval start time, thus enabling an overlap that will take care of the CCMS Alerts that were pulled into CEN with a delay. The Management Pack alert suppression configuration prevents the duplicate SCOM alerts generation.

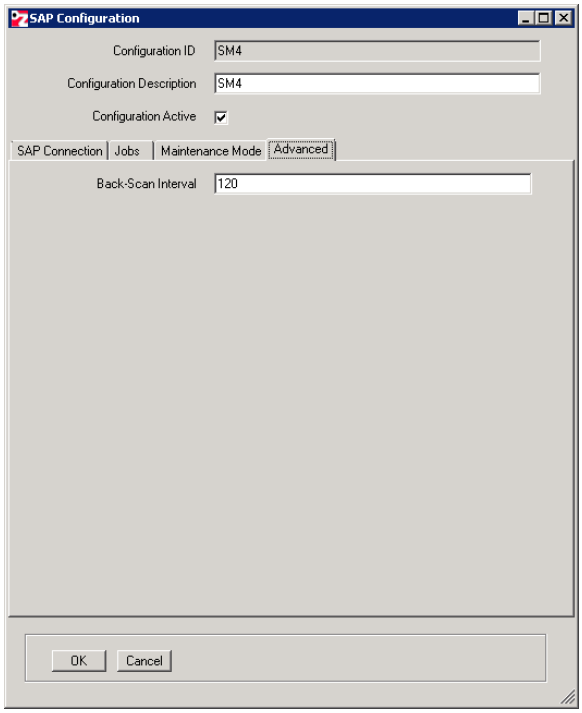


Figure 34. Alert Back-Scan Interval

Delete SAP System SCOM Objects for Missing/Inactive SAP Configurations

You can instruct the Management Pack to automatically delete SAP System Object in SCOM for missing/deactivated SAP System configurations.

By default the SCOM Object **are not deleted** for **missing** and **inactivate** SAP Configurations, to configure Object Deletion see Advanced Options

Advanced Options

To configure the advanced options in the "SAP" tab locate and click (***Advanced)*** button.

The following window will appear:

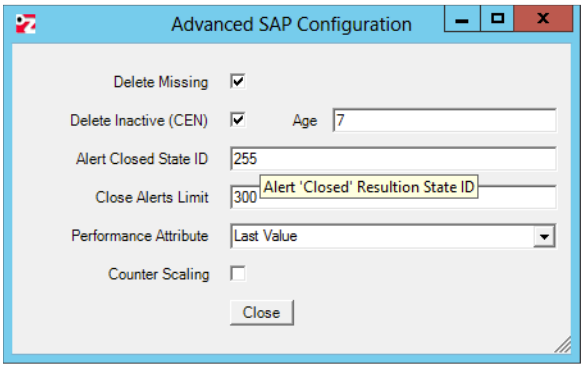


Figure 35. Advanced SAP Configurations

Delete Missing

This flag instructs the Management Pack to automatically delete SAP System Object in SCOM for missing/deactivated SAP Configurations. By default the SCOM Object **are not deleted** for **missing** and **inactivate** SAP Configurations

Delete Inactive (CEN)

This flag instructs the Management Pack to periodically check all SAP Objects in SCOM for the existence of any Alerts or Performance Counters for the last <Age> days. In Solution Manager set-ups where there is no direct connection to satellite SAP systems this is the only way to determine if the object has been removed or became irrelevant from monitoring perspective. By default the SCOM Object **are not checked** for inactivity

Age

This attribute specifies the number of days to wait before deleting SAP Objects with no CCMS Alerts or Performance Counters have been posted for the number of days.

The evaluation and removal takes place when System Discovery is executed (see scheduling configuration for the interval). It is always triggered on the Connector Service Startup.

Alert Closed State ID

This attributes allows for Alert Resolution State customizations - the Management Pack uses this ID to detect Closed Alerts if completion of SAP CCMS Alert on SCOM Alert closure is configured.

Close Alert Limit

Performance Attribute

This attribute allows for choosing the CCMS Performance Attribute field used for Performance Counter data retrieval

The following fields are supported:

- **Last Value** (default) – represent last collected performance value
- **1 minute Average** – average value for the last 1 minute
- **5 minute Average** – average value for the last 5 minutes
- **15 minute Average** – average value for the last 15 minutes

Counter Scaling

Some of the SAP Performance Attribute values contain raw data that requires scaling to accurately represent the monitored metrics. The scaling info however has to be retrieved from SAP for each Performance Counter individually. Although the Management Pack performs extensive caching, turning this option on may generate a significant overhead impacting SAP Performance.

Saving the configuration

In the main window click ***Save*** to save the configuration to the file.

The file is located at *<Installation Folder>\conf\CONFIG.XML*, we recommend that you back it up before and after the configuration has been saved.

Repeat the procedure for additional SAP Systems. Be advised that although you can configure any number of systems in the configuration utility only up to the maximum number allowed by the license will be active at the runtime.

Registering Management Pack Product Information in SAP System Landscape Directory (SLD)

Optionally SAP System Landscape Directory registration of the Management Pack may be required in your organization.

To import the Management Pack Product Information into SLD in the "SAP" tab locate and click  (**Import SAP SLD Product Definition**) button.

The following window will appear:

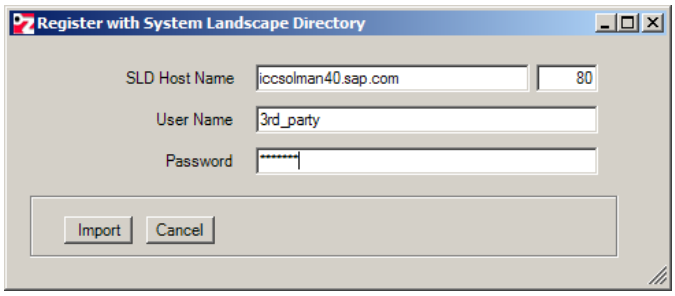


Figure 36. Importing Product Information into SAP System Landscape Directory

! Please make sure you have obtained SLD Server Host, Port, User Name and Password from your SAP Administrator and that the user is assigned to **LcrInstanceWriterLD** role.

Press "Import".

The template file used to generate the SLD registration information is located at ***<Installation Folder>\conf\SLD_TEMPLATE.XML***

After the Import button is pressed (even if the registration has failed) an SLD registration file containing current registration information is created and saved as ***<Installation Folder>\conf\SLD.XML***

If the automatic registration failed you can import this file manually. For the instructions please refer to SAP System Landscape Directory Administration Guide.

Running Management Pack

1) Verify that "SAP Management Pack" windows service exists and running
2) Check Windows Application Event Log for events with Source "OZMP4SAP". If the connector is not able to connect to SCOM the messages will be posted to the Event Log.
3) Check for SAP Connection Alerts in SCOM

Troubleshooting

The Management Pack supports three types of logging mechanism, depending on the component:

1) If the problems are related to the operations of the Management Pack within the SCOM – please refer to the ***Active Alerts*** branch in the ***Monitoring*** section of Operations Console
2) Most of the problems related to SAP Connector interactions with the SAP are logged as SAP Connector Events. The alerts are automatically generated for these events.
3) If the Management Pack SAP Connector is not able to communicate with SCOM the Windows Event Log is used to log the errors. Look for the events in *Applications and Services Logs\OZSoft* as seen in the figure below:

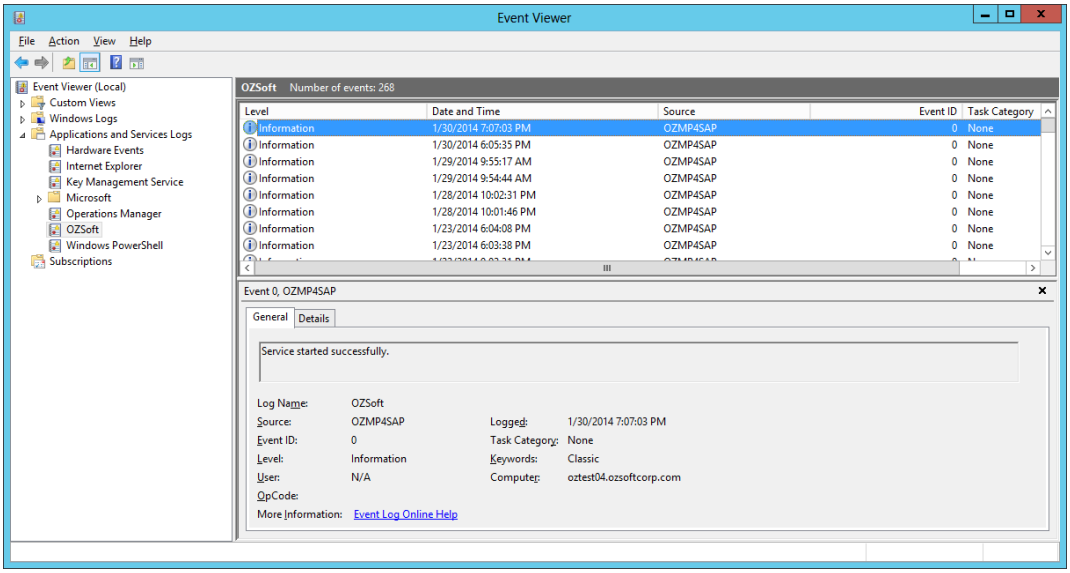


Figure 37. Management Pack Windows Event Log

If none of these methods provides the sufficient information to determine the source of the malfunction, please contact OZSoft Consulting Support, for the instructions on how to run the Management Pack in the Diagnostic Mode.

Using Management Pack

Don't forget that the control over what type of CCMS Alerts are retrieved and what performance metrics and for which application server are collected is exercised through the definitions on the SAP side – transaction RZ20 allows to modify CCMS Monitor definitions. As a best practice it is always convenient to have a dedicated Monitor Set with several Monitor definitions for the Management Pack. You can export it from SAP for backup purposes and import later.

All SAP related pre-configured views are located under SAP branch in the Monitoring pane.

Discovery

SAP Systems are discovered by Management Pack Connecter based on the manual configuration. If a System configuration is removed from the file the SAP System Object will be removed from Operations manager as well.

For each connected SAP System the list of Application Servers is automatically discovered. If the application server configuration is removed from SAP the corresponding Operations Manager Object will be removed as well.

The discovery intervals are defined using Management Pack configuration utility and described in Scheduling

Discovery with Central Monitoring (CEN)

If the Management Pack is connected to an SAP System that is configured as a Central Monitoring System (CEN) the discovery of the Application Servers and System properties only applies to the CEN System, not all the SAP system connected to the CEN System. However when CCSM Alerts and Metrics are retrieved, if they belong to one of the CEN-connected system the corresponding SAP System Object and Context Objects (such as Application Server, Database etc.) will be created in SCOM and Counter/Alerts will be associated with it, thus even though the Management Pack is connected only to the CEN System, the SCOM users will see all CEN Connected System and their App Servers in SCOM Console.

! The licensing restrictions (the number of connected SIDs allowed) apply to the CEN-connected Systems – if the limit is reached – the alerts and metrics for the additional systems will not be posted into SCOM and a SCOM Alert is generated indicating that the licensing limit is reached.

Global Dynamic Group

SAP Management Pack includes a dynamic Group "**SAP Objects Group**". The group contains all SAP Management Pack Objects.

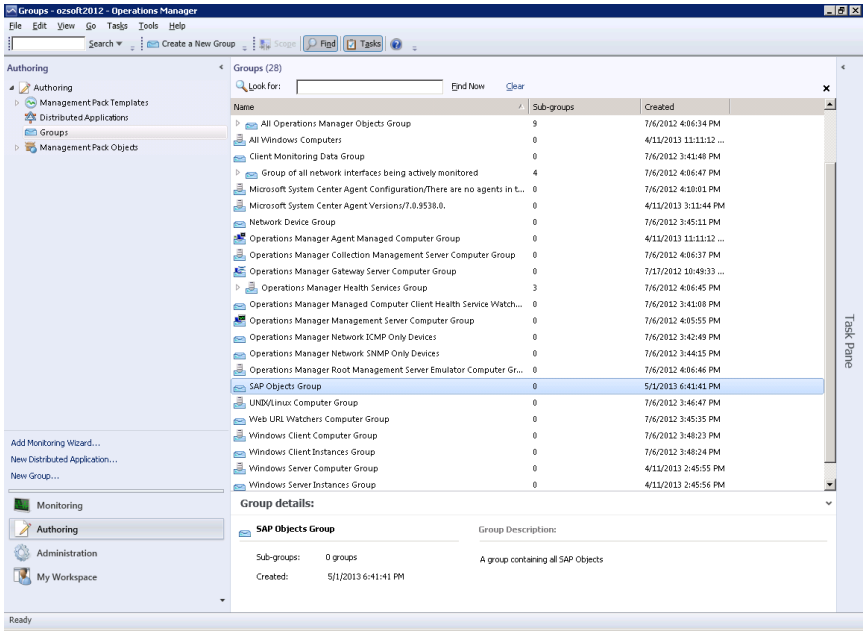


Figure 38. SAP Dynamic Group

Per-SID Dynamic Groups

To simplify per-SAP SID Threshold overrides (due to the fact that each system typically has several App Servers and other components) SAP Management Pack incorporates fully dynamic per-SID groups. The groups are created and populated dynamically by the SAP Connector. Please see makes sure the Group Population field in Scheduling is set appropriately.

For each SAP System 2 groups are created:

- **<SID> Components –** Contains all SAP System Components
- **<SID> AppServers** - Contains all SAP System Applications Servers

! These groups are only usable when creating overrides. The groups will not appear on the Group List in the Authoring mode due to non-Singleton object types.

Server Monitoring Dependency Discovery

SAP Management Pack automatically discovers the dependency between SAP Application Server and monitored (Windows or Unix/Linux) Computers in SCOM.

SAP Systems and Components Navigation

You can see the monitored SAP systems and it's components by clicking on *SAP Systems* View.

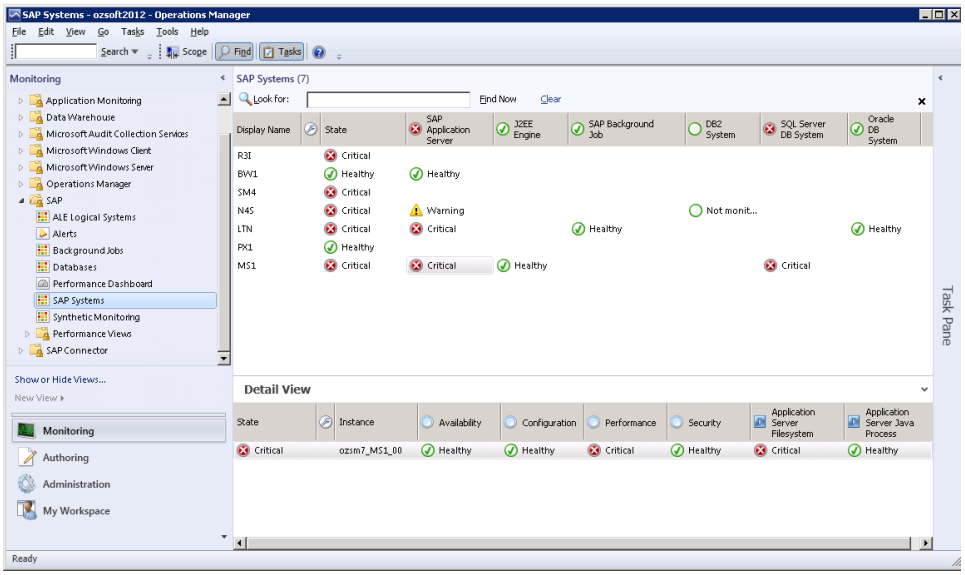


Figure 39. SAP System View

SAP System Maintenance Mode

When an SAP system Object is put into Maintenance Mode, the SAP Connector will stop collecting Alert, Availability and Performance counters. If the SAP System is the Central Monitoring system – the collection for all satellite system will stop as well.

Charting Performance Counters

To View the performance metrics you either select a preconfigured Performance dashboard at *SAP/SAP Performance*

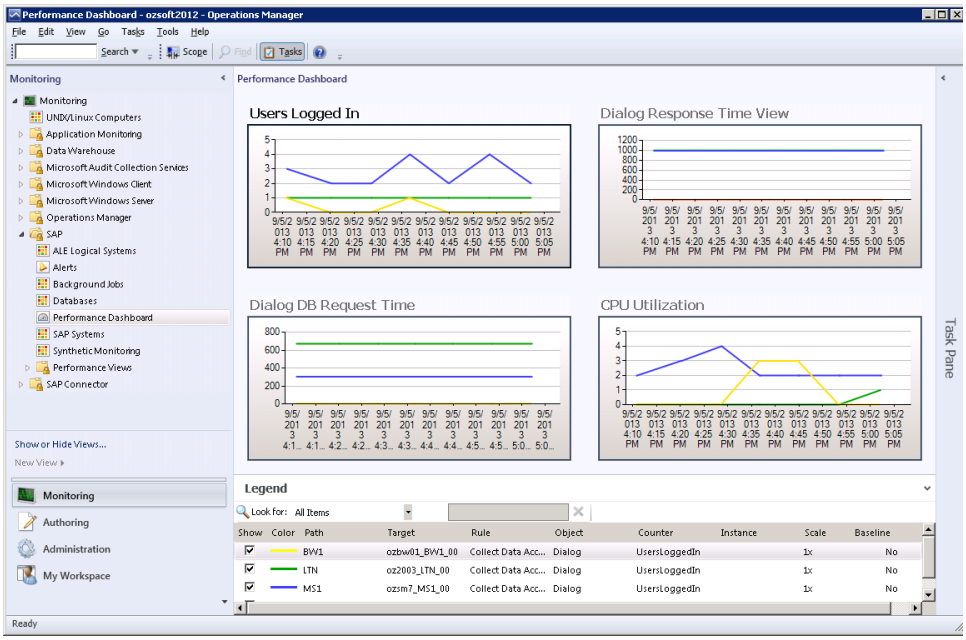


Figure 40. SAP Performance Dashboard

Before you can get the preconfigured dashboard charts populated you will need to perform the initial setup.

The first step is to configure all SAP Monitors (on the SAP side) to include the MTEs required. You can verify which systems are collecting the values by selecting each of the four charts (just click on it). In the section below it should display all Performance Counters with the appropriate names (e.g. ***DialogResponseTime*** etc., depending on the chart) across all the SAP system connected. You need to check those that are of the interest. If you don't see the counters form a system (and the system is connected) - most probably the SAP Monitors are not configured properly

You need to repeat this for all four charts, after you selected it once - it is saved automatically - you will see the charts populated from now on. You can adjust the time range for individual charts to show the desired time interval.

Every time a new system is discovered (new connection configured or a new system connected to a CEN system) you will need to repeat the procedure to include the counters from the new system.

Alternatively you can create a custom Performance View in "My Workspace". To view all available performance counters – in SAP Systems view right-click on the specific system and choose *Open->Performance View*

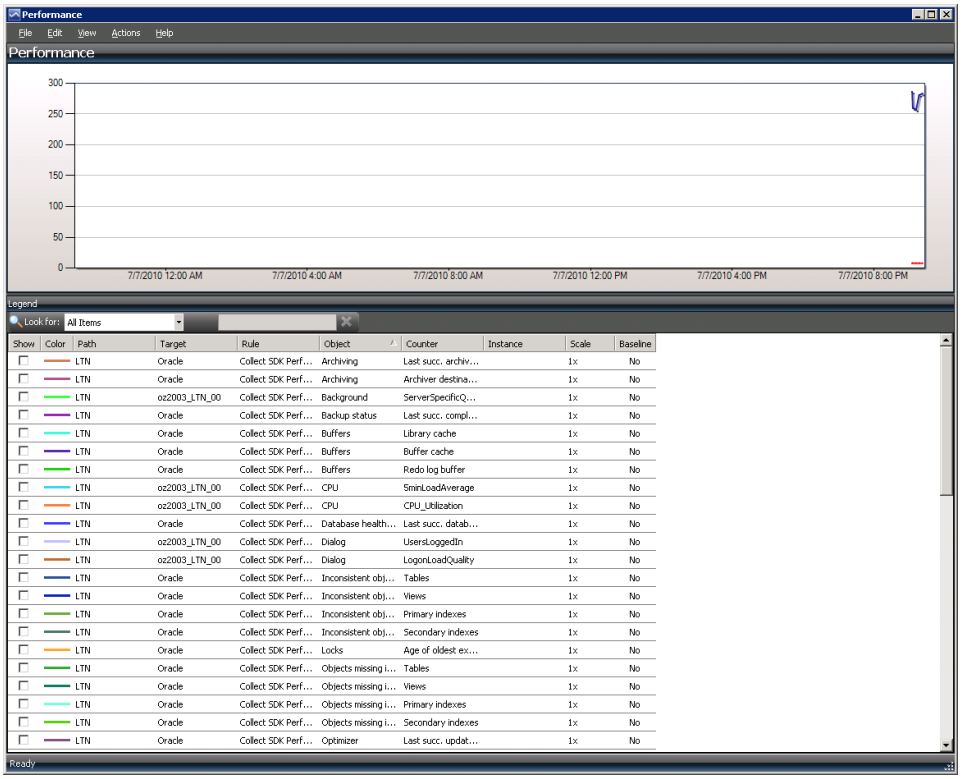


Figure 41. SAP System Performance View

The list of the available performance counters will differ based on your Monitor definition is SAP.

Alert Management

Alert Generation

We provide three rules for the SCOM Alert generation for SAP System and SAP Component objects (App. Servers, Database etc.). These rules are configured to generate an Alert for every CCMS Event posted by SAP Connector. The severity of SCOM Alerts is matched to CCMS Alert Value, which in SAP indicates that the alert is Green, Yellow or Red. The SCOM Alerts Severity is assigned as Information (1), Warning (2) or Critical (3) respectively. Each of the preconfigured rules is responsible for generating alerts with a specific severity.

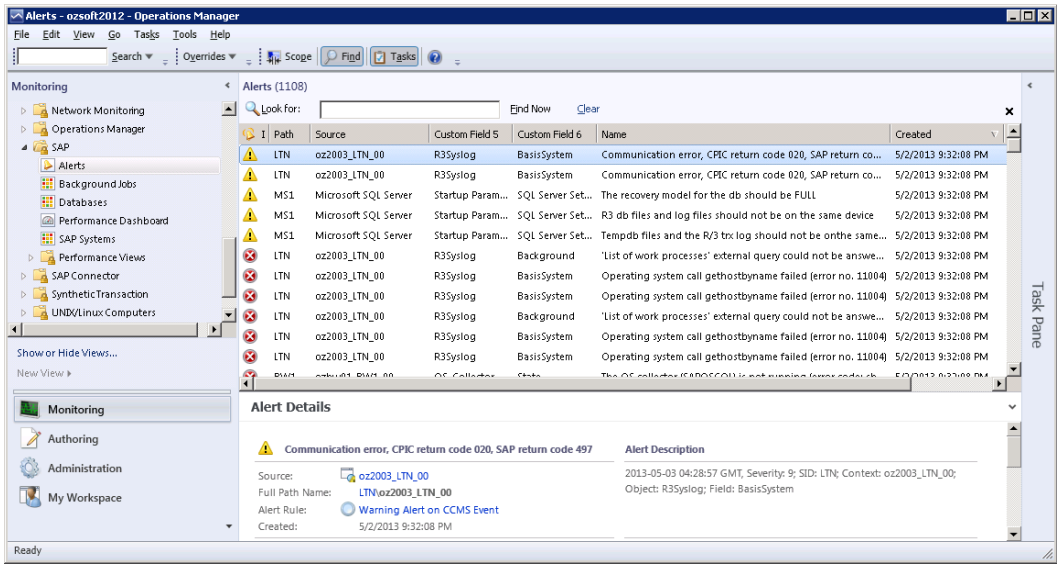


Figure 42. SAP Alerts

The Alert attributes are initialized with CCMS Event values as the following:

Alert Attribute	CCMS Event Attribute	Value
Name	MSG	Alert Message
Description	MSG	<Alert Time GMT>, Severity: <Severity>; SID: <SID>; Context: <Alert Context>; Object: <Object Name>; Field: <Field Name>
Custom Field 1	Not used	
Custom Field 2	ALUNIQNUM	Alert ID
Custom Field 3	MTSYSID	Alert System ID
Custom Field 4	MTMCNAME	Monitoring Context Name (in most cases the App Server name)
Custom Field 5	OBJECTNAME	Monitoring Object Name
Custom Field 6	FIELDNAME	Monitoring Field Name
Custom Field 7	USERID	User Logon Name
Custom Field 8	MSGID	Message ID
Custom Field 9	SEVERITY	Alert Severity
Custom Field 10	SAP SID	SAP SID the alert was retrieved

Table 2. CCMS Alert Custom Fields

In order to turn on/off the alerts generation for a specific severity – override the rule's ***Enabled*** attribute. Choosing override Object Name/Type you can enable/disable alerting for the specific SAP Contexts (Components – such as App. Servers, Database, etc.). By default the Information Severity rules are disabled.

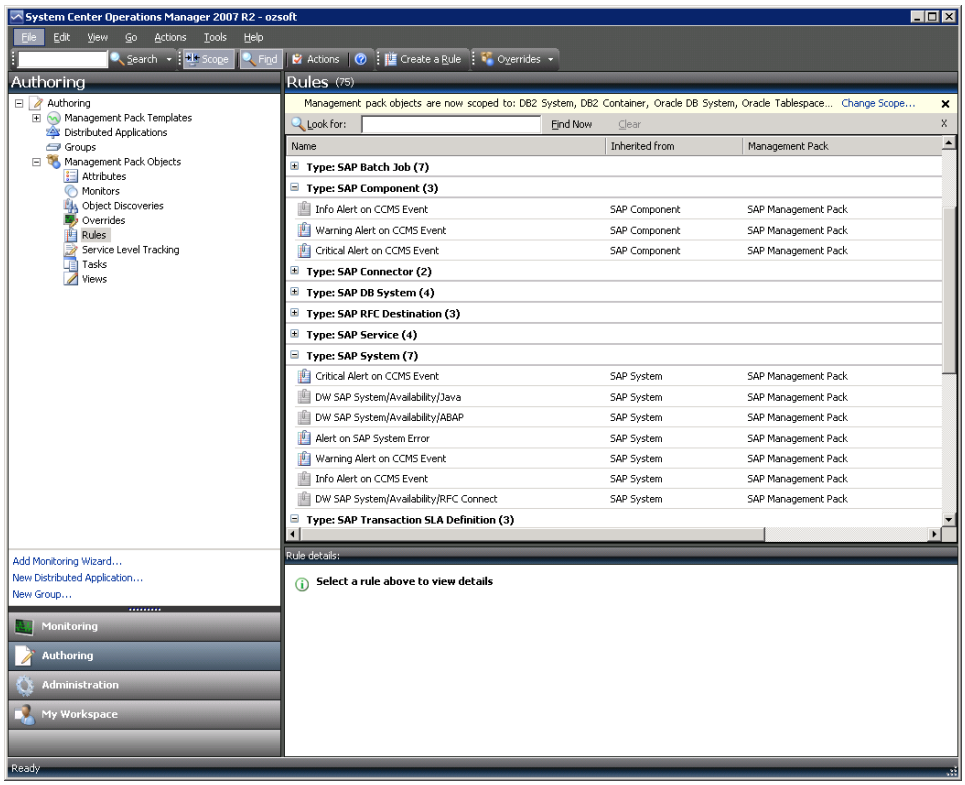


Figure 43. Alert Rules

Alert Acknowledgement

When you close an alert generated for a CCMS Alert, the Management Pack will attempt to acknowledge it on the SAP System. Optional, see "**Complete Closed Alerts**" field in Scheduling.

Alert Synchronization

When a CCMS Alert is *completed* on SAP the corresponding Alert is *closed* in SCOM. Optional, see "**Close Completed Alerts**" field in the ***Advanced Options***.

Alert Customization Add-On Management Pack

The unsealed Add-On Management Pack facilitates customizations of CCMS/SCOM Alert generation including Suppression criteria, Custom Field population. Etc.

The Management Pack is supplied as an XML file that can be imported into SCOM and will override the default alert generation rules.

The management pack file is located at *<Installation Folder>\scom\ozsoft.sap.alerts.xml*

The Alerts Management Pack allows for selective alert suppression. At this time the configuration requires manual modification to the configuration file:

Edit configuration file located in ***<Installation Folder>\conf\CONFIG.XML***

Under `<SCOM>` element add or modify `<ALERTS_UNIQUE_MASKS>…</ALERTS_UNIQUE_MASKS>` element. The element contains coma-separated list of <Object Name>/<Field Name> combinations where <Object Name> and <Field Name> are the RegEx masks for alerts' Object Name and Field Name fields. All Alerts with the matching fields will be declared "Unique" and will not be suppressed.

By default the alerts with the field combinations of ***Background/AbortedJobs*** and **R3Abap/Shortdumps** are suppressed. Changing the value of ALERTS_UNIQUE_MASKS parameter will disable the default values and they will need to be included explicitly.

Monitoring

The Management Pack includes a large number of preconfigured Performance and Availability monitors. Additional monitors can be created as required, see Appendix for more details.

Native OS Monitoring Integration

SAP Management Pack automatically discovers the dependency between SAP Application Servers and existing Windows and Unix/Linux Servers in SCOM.

The Server Computer Availability, Performance and Security Dependency Monitors are added to the SAP Application Server thus ensuring the Server State is propagated up to the SAP System object:

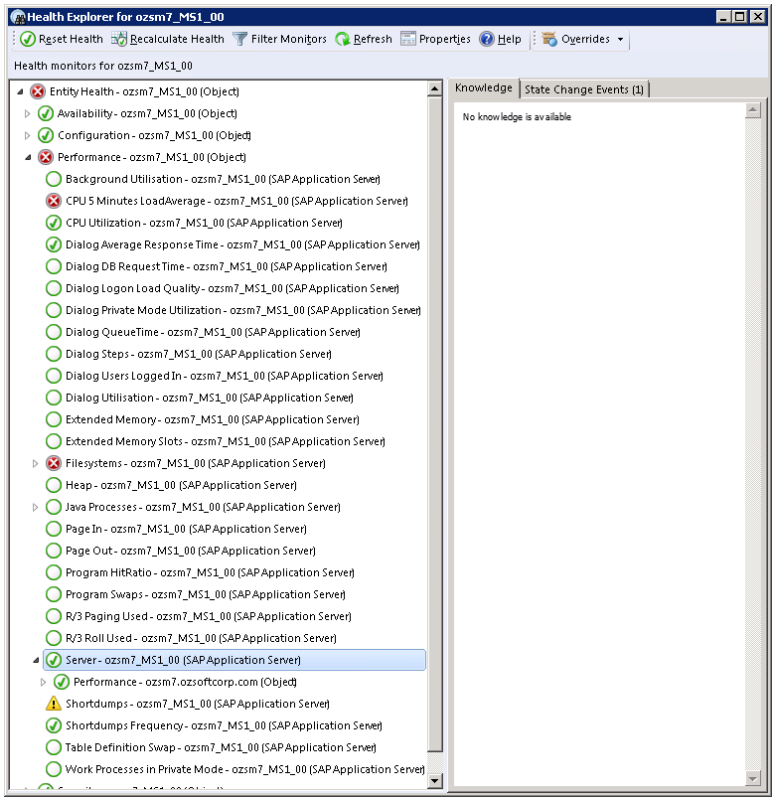


Figure 44. Native OS Monitoring Integration

> ! The match between an SAP App Server and a Computer is based on App Server Host Name as reported by SAP. If the Virtual Host is used the match might not be found.

Configuration

SAP Application Server / Computer dependency discovery is performed as a part of **Group Population** activity. Please refer to "**Group Population"** field in Scheduling for configuring the repeat interval as well as disabling the feature.

SAP Availability Monitoring

In addition to standard CCMS Metrics the Management Pack Connector collects Application Server availability and SAP System RFC Connect Availability.

The Management Pack includes 2 preconfigured monitors for the above mentioned Performance Counters.

These Performance Counters are only collected for directly connected SAP Systems. For availability monitoring of the systems connected to the Solution Manager (or other CEN) please see the *Integration with SAP Solution Manager Availability Monitoring* below.

Integration with SAP Solution Manager Availability Monitoring

The Management Pack integrates with SAP Solution Manager Availability Monitoring.

Standard SAP Availability monitoring relies on SAP Solution Manager (or any Central Monitoring System) and CCMSPING utilities installed on the monitored systems (ABAP or Java).

When monitoring the remote systems the Solution Manager updates several Performance Attributes in the central CCMS:

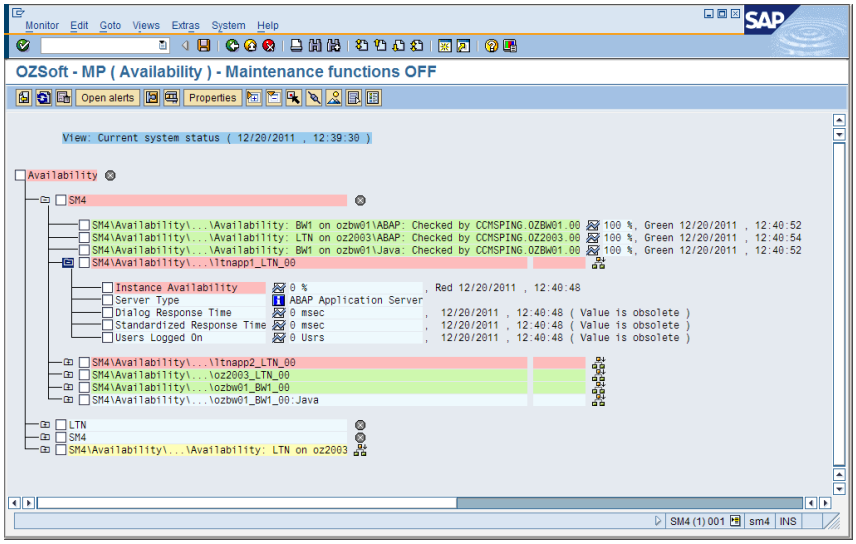


Figure 45. CCMS Availability Monitoring Context

Please note that all availability-related alerts and performance counter are located in CCMS under the Availability context of the Solution Manager system, not the actual SAP system been monitored:

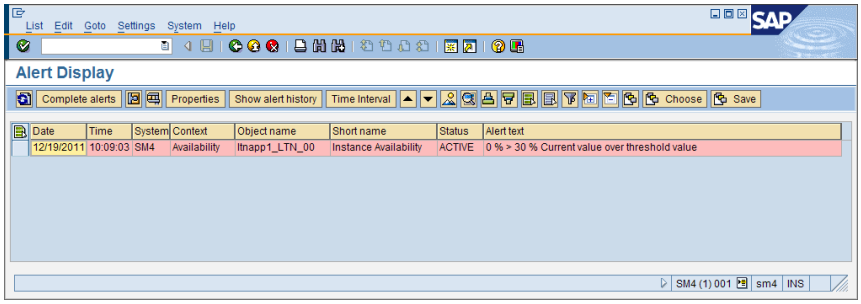


Figure 46. CCMS Availability Alert

When Alerts and Performance Counters are pulled into the Operations Manager this arrangement makes it challenging to understand the impact on the actual system/app server as the alerts/counters would be associated with the Solution Manager's system objects and not with the actual system they are intended. The Management Pack faces this challenge by implementing an intelligent processing mechanism that associates alert and performance counter with the proper SAP system/application server objects:

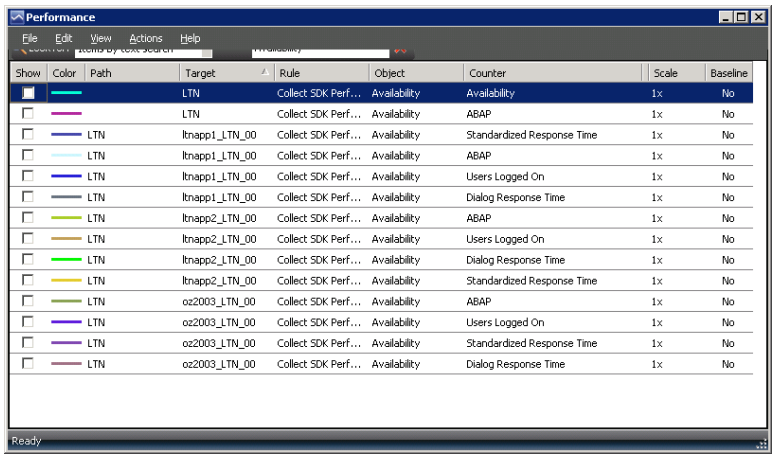


Figure 47. SCOM Availability Performance Counters

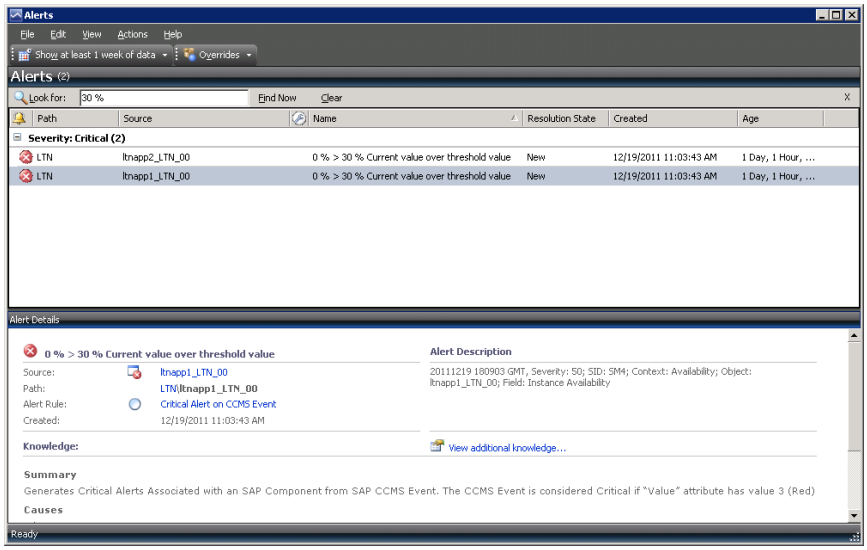


Figure 48. SCOM Availability Alerts

The Management Pack includes the following preconfigured monitors for Availability monitoring of the whole SAP Systems as well as the individual App Servers:

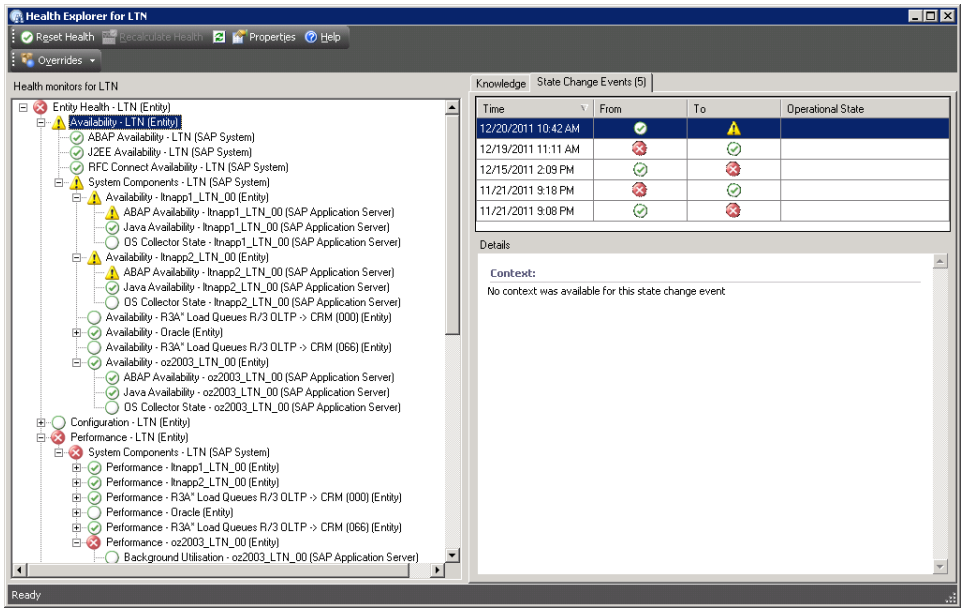


Figure 49. Availability Monitors

SAP Service Levels Monitoring

The Management Pack integrates with SAP CCMS Service Level Monitoring.

You can use the CCMS monitoring architecture to monitor the response times of a specific client, an SAP transaction or a transaction for clients. This can be used to implement a service level agreement which places an obligation on the service provider to deliver SAP services to their customers within a specified response time. For example, the service level agreement could be based on the response times of the client used by the customer of the service level agreement or on the response times of critical transactions in all clients or only in a certain client.

See Transaction-Specific Dialog Monitor (SAP Library - The Alert Monitor) for the CCMS configuration instructions.

For the Management Pack to be able to retrieve these values, the appropriate SAP monitors need to be configured using transaction RZ20. When properly configured you should see one or more entries in RZ20 as in the screenshot below:

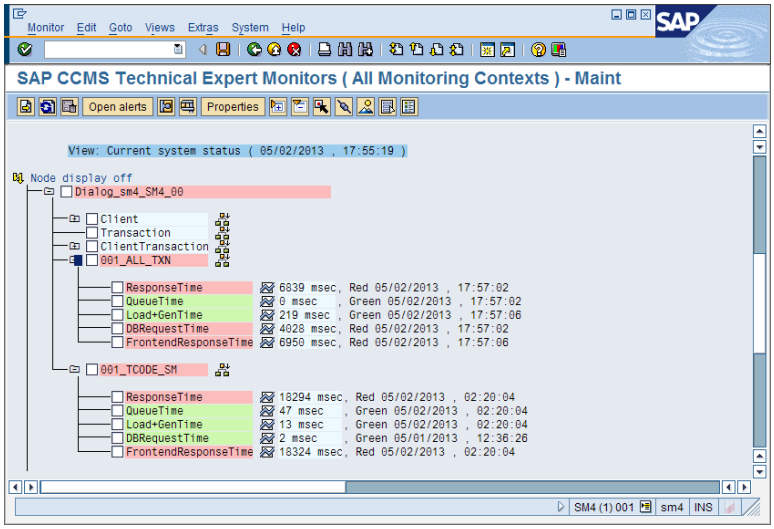


Figure 50. CCMS: SAP Service Level Monitoring

Please make sure that the Management Pack connector is configured to utilize the CCMS Monitor that includes above MTEs (see SAP Connection Parameters)

The Management Pack automatically discovers all Service Level definitions and creates corresponding Object with Performance and Availability Monitors:

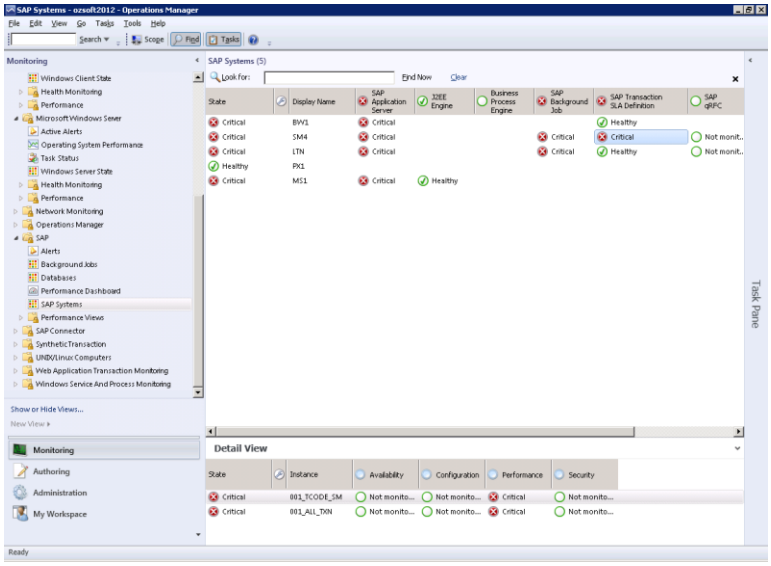


Figure 51. SAP Transaction Service Levels

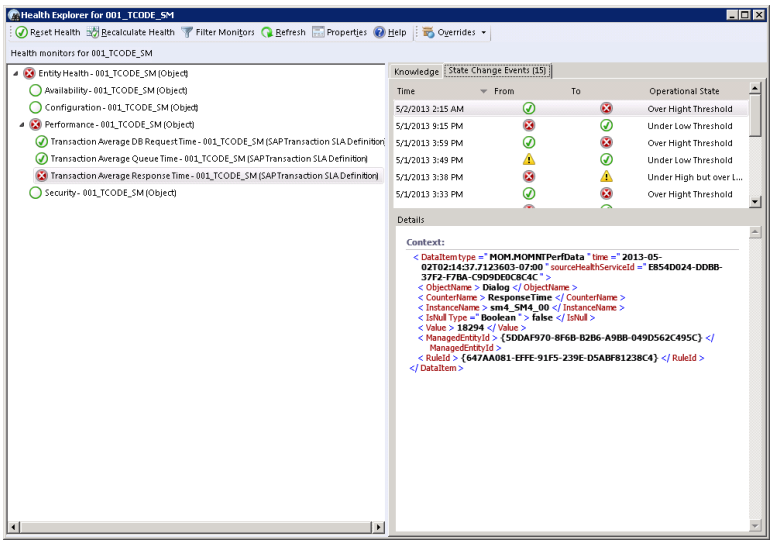


Figure 52. SAP Transaction Service Level Monitors

SAP Background Job Monitoring

The Management Pack implements 2 ways to monitor Background Jobs in SAP:

Integration with SAP CCMS Background Job Monitoring

Please see Appendix C for the instructions on how to configure CCMS.

For the Management Pack to be able to retrieve these values, the appropriate SAP monitors need to be configured using transaction RZ20. When properly configured you should see one or more entries in RZ20 as in the screenshot below:

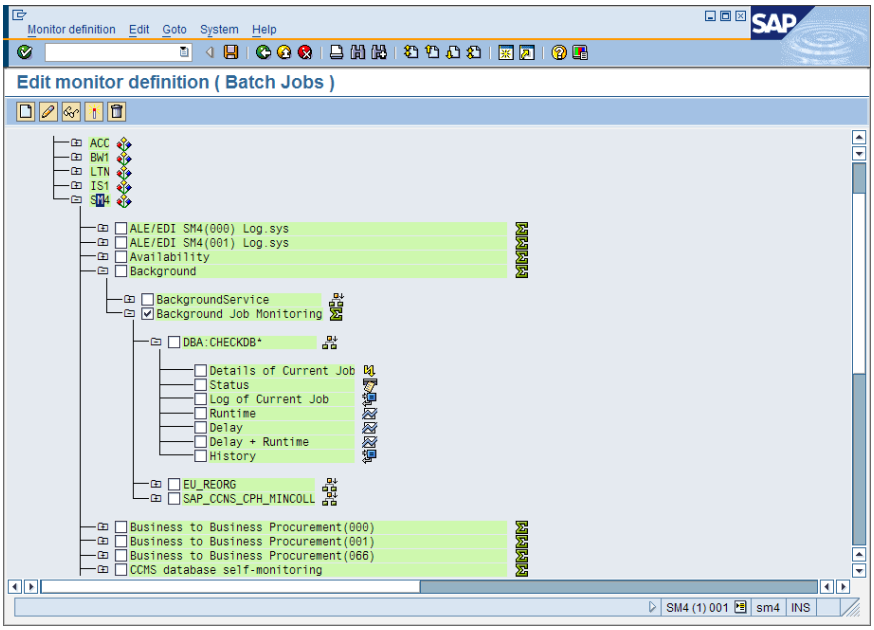


Figure 53. CCMS: SAP Batch Job Monitoring

Please make sure that the Management Pack connector is configured to utilize the CCMS Monitor that includes above MTEs (see SAP Connection Parameters)

For every CCMS Job Monitoring entry the management pack creates an Object with Performance and Availability Monitors attached.

Built-in Background Job Monitoring

Unfortunately CCMS Background Job Monitoring mentioned above lacks important functionality and flexibility, therefore SAP Management Pack incorporates integrated Background Job Monitoring that does not rely on CCMS and alleviates the limitations of CCMS Background Job Monitoring.

The built-in Background Job Monitoring exploits SAP External Background Processing (XBP) interface and requires a direct connection to SAP systems (Solution Manager can't be used to monitor jobs on the satellite systems). See Background Job Monitoring for the configuration instructions

For every SAP Background Job matching the filters the management pack creates an Object with Performance and Availability Monitors attached.

For every discovered Background Job the Management Pack calculates the following Performance Counters:

- **Delay** – for the Ready/Active Jobs – Seconds between the Job was released and Started (or current time if is still not running)
- **Runtime** – for the Active/Completed Jobs - Seconds since the Job was Started (or until completed)
- **Delay+Runtime** – a sum of Delay and Runtime
- **Duration** – for the Completed Jobs – Seconds between the Job was Started and Completed
- **Status** – for the Completed Jobs – 1 – if Job Has Finished, 3 – if Job Has been Canceled

For Periodic Background Jobs the Health Status of the job is reset automatically 60 minutes after the last job completion. If the periodic interval is less than 60 minutes (plus potentially the value in **Background Jobs** scheduling configuration parameter) the reset will not take place.

Background Job Failure Alerts are matched to an existing SCOM Job Object and if such object exists, they are associated with it.

! We do not recommend configuring both CCMS Background Monitoring and MP Background Job Monitoring for the same SAP System due to unpredictable Periodic Jobs Auto-reset behavior. To disable CCMS Background Monitoring exclude corresponding MTE from CCMS Monitor on SAP System using transaction RZ20

Monitoring

The ***Background Jobs*** view lists all monitored job across all SAP Systems:

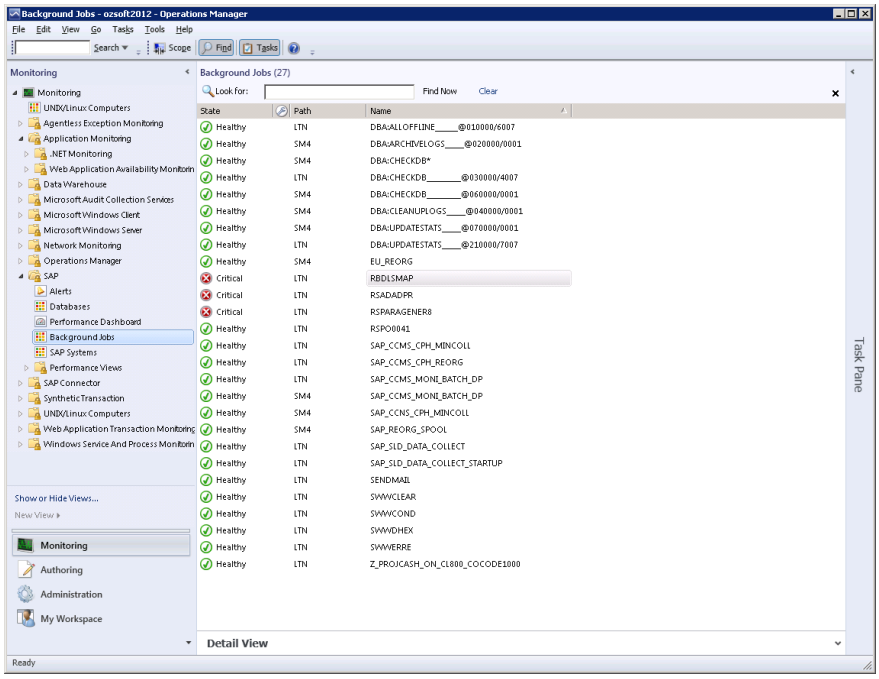


Figure 54. Background Jobs View

Each Background Job object has the following Monitors attached:

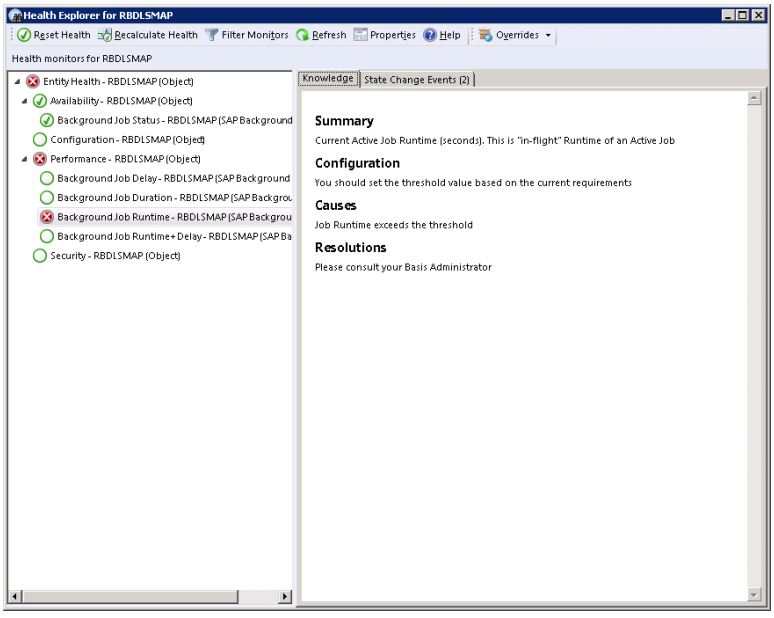


Figure 55. Background Job Monitors

Enqueue Monitoring

The Management Pack integrates with CCMS Enqueue Monitoring.

Configuration

- Create new CCMS Monitor in SCOM Monitor Set (transaction **RZ20**). An importable Monitor definition is available in *<Installation Folder>\sap\MonitorEnqueue.XML*
- Import **Enqueue Add-On Management Pack** located in *<Installation Folder>\scom\ozsoft.sap.enqueue.mp*

SAP Management Pack discovers a single **Enqueue Server** object for each SAP System. There a number of monitors are delivered in the add-on management pack. Depending on the Monitor they are associated either with **Enqueue Server** or specific **Application Server**:

Target Object	Monitor Name	Description
Enqueue Server	**Backup Requests**	Monitors the Number of Backup Requests
Enqueue Server	**Clean Up Requests**	Monitors the Number of Clean Up Requests
Enqueue Server	**Dequeue Request Errors**	Monitors the Number of Dequeue Request Errors
Enqueue Server	**Dequeue Requests**	Monitors the Number of Dequeue Requests
Enqueue Server	**Dequeue All Requests**	Monitors the Number of Dequeue All Requests
Enqueue Server	**Enqueue Request Errors**	Monitors the Number of Enqueue Request Errors
Enqueue Server	**Enqueue Request Rejects**	Monitors the Number of Enqueue Request Rejects
Enqueue Server	**Enqueue Requests**	Monitors the Number of Enqueue Requests
Enqueue Server	**Recent Lock Wait Time**	Monitors the Recent Lock Wait Time (per minute)
Enqueue Server	**Recent Lock Time**	Monitors the Recent Lock Time (per minute)
Enqueue Server	**Update Queue Actual**	Monitors the Update Queue Actual Length
App Server	**Completed Enqueue Work Processes**	Monitors the Number of Completed Enqueue Work Processes
App Server	**Errors in Enqueue Work Processes (Frequency)**	Monitors the Number of Errors in Enqueue Work Processes per Minute
App Server	**Errors in Enqueue Work Processes**	Monitors the Number of Errors in Enqueue Work Processes
App Server	**Enqueue Server Percentage length of the queue**	Monitors the Percentage length of the Queue Utilized
App Server	**Enqueue Server Utilisation Granule Arguments**	Monitors the Granule Arguments Queue Utilization
App Server	**Enqueue Server Utilisation Granule Entries**	Monitors the Granule Entries Queue Utilization
App Server	**Enqueue Server Utilization Owner Names**	Monitors the Owner Names Queue Utilization

Table 3. Enqueue Monitors

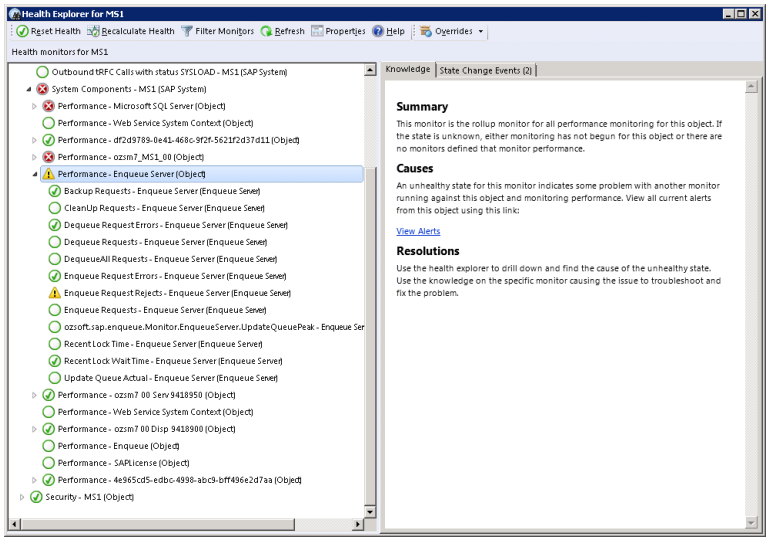


Figure 56. Enqueue Monitoring

ALE/IDoc Monitoring

The Management Pack integrates with CCMS ALE/IDoc Monitoring.

Configuration

- Define ***ALE/IDoc monitoring objects*** in the IMG (transaction ***SALE*** *> Set-Up System Monitoring > Central Monitoring of all Systems > ALE Monitor Objects (BDMO)*).
  For analysis purposes, ALE monitoring objects form a group of associated selection options based on IDoc attributes. Individual objects are assigned values based on the current system status and the assignment of selection options from IDoc attributes.
- Create new CCMS Monitor in SCOM Monitor Set (transaction **RZ20**). An importable Monitor definition is available in *<Installation Folder>\sap\MonitorALE.XML*
- Import **ALE/IDoc Add-On Management Pack** located in *<Installation Folder>\scom\ozsoft.sap.ale.mp*

SAP Management Pack discovers **ALE Logical System** and corresponding **ALE (IDoc) Monitoring objects** described above.

A State View for all ALE Logical Systems is under SAP folder:

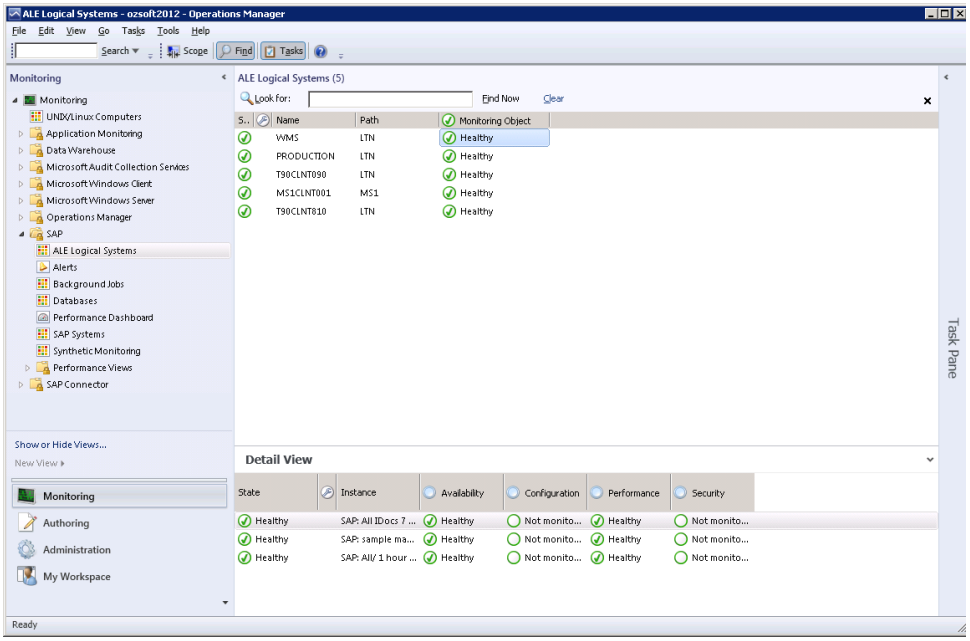


Figure 57. ALE Logical Systems View

The **ALE (IDoc) Monitoring objects** have the following Monitors associated with it:

Target Object	Monitor Name	Description
IDoc Monitor Object	**Outbound IDocs with Delete flag**	Monitors the Number of Outbound IDocs with Delete Flag
IDoc Monitor Object	**Outbound IDocs Ready for Dispatch**	Monitors the Number of Outbound IDocs Ready for Dispatch
IDoc Monitor	**Outbound IDocs Processing in Target System**	Monitors the Number of Outbound IDocs Processing in Target System
IDoc Monitor	**Outbound IDocs Dispatched**	Monitors the Number of Outbound IDocs Dispatched
IDoc Monitor	**Outbound IDocs Generated**	Monitors the Number of Outbound IDocs Generated
IDoc Monitor	**Outbound IDocs Errors in the interface**	Monitors the Number of Outbound IDocs Errors in the interface
IDoc Monitor	**Inbound IDocs with Delete flag**	Monitors the Number of Inbound IDocs with Delete flag
IDoc Monitor	**Inbound IDocs Transferred to Dialog**	Monitors the Number of Inbound IDocs Transferred to Dialog
IDoc Monitor	**Inbound IDocs Transferred to Application**	Monitors the Number of Inbound IDocs Transferred to Application
IDoc Monitor	**Inbound IDoc Application Documents posted**	Monitors the Number of Inbound IDoc Application Documents posted
IDoc Monitor	**Inbound IDocs Generated**	Monitors the Number of Inbound IDocs Generated
IDoc Monitor	**Inbound IDoc Errors in the interface**	Monitors the Number of Inbound IDoc Errors in the interface
IDoc Monitor	**Inbound IDoc Errors in applications**	Monitors the Number of Inbound IDoc Errors in applications

IDoc Monitor	**Open Change Pointers**	Monitors the Number of Open Change Pointers
IDoc Monitor	**tRFC Queue Remote Calls Waiting**	Monitors the Number of tRFC Queue Remote Calls Waiting

Table 4. IDoc Monitors

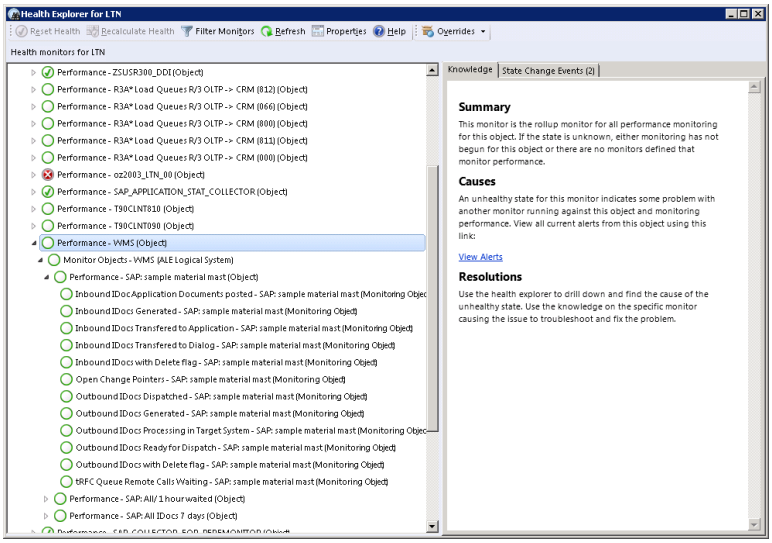


Figure 58. ALE/IDoc Monitoring

SAP RFC Destinations Availability Monitoring

The Management Pack integrates with SAP CCMS RFC Destination Monitoring. See Appendix F for the instructions on how to configure CCMS.

For the Management Pack to be able to retrieve these values, the appropriate SAP monitors need to be configured using transaction RZ20. When properly configured you should see one or more entries in RZ20 as in the screenshot below:

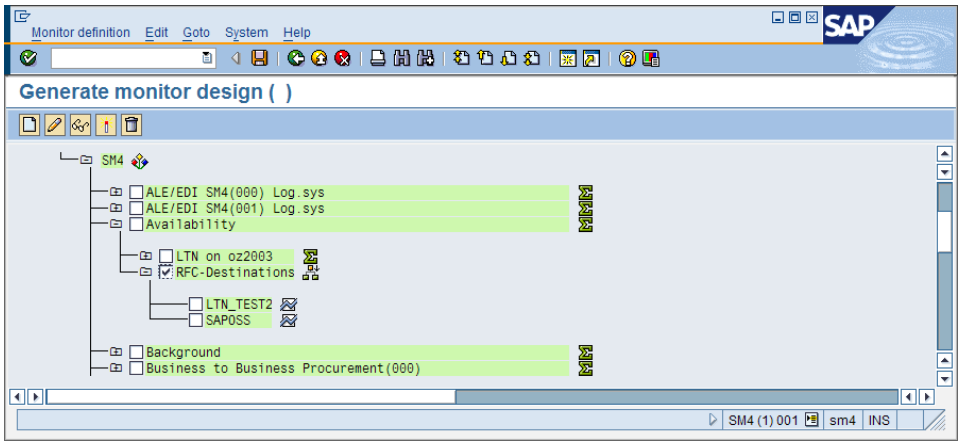


Figure 59. CCMS: SAP RFC Destination Monitoring

Please make sure that the Management Pack connector is configured to utilize the CCMS Monitor that includes above MTEs (see SAP Connection Parameters)

For each CCMS RFC Destination entry the management pack creates an Object with an Availability Monitor attached. You can see all RFC Destination entries across all SAP system under **RFC Destinations** view:

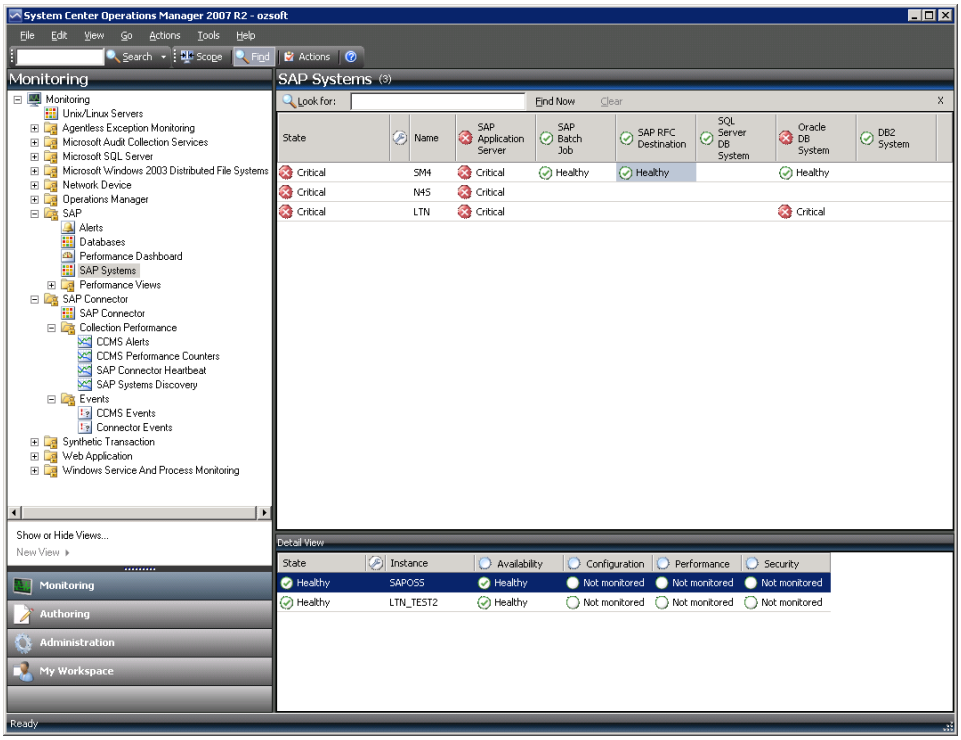


Figure 60. RFC Destinations

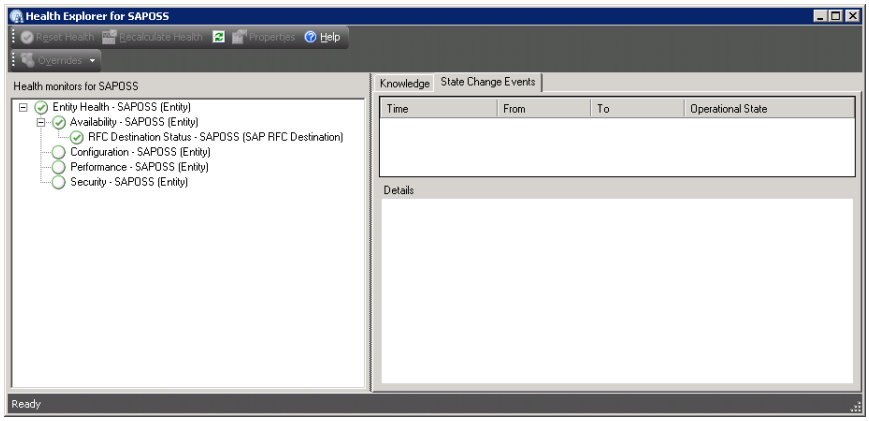


Figure 61. RFC Destination Monitors

tRFC/qRFC Monitoring

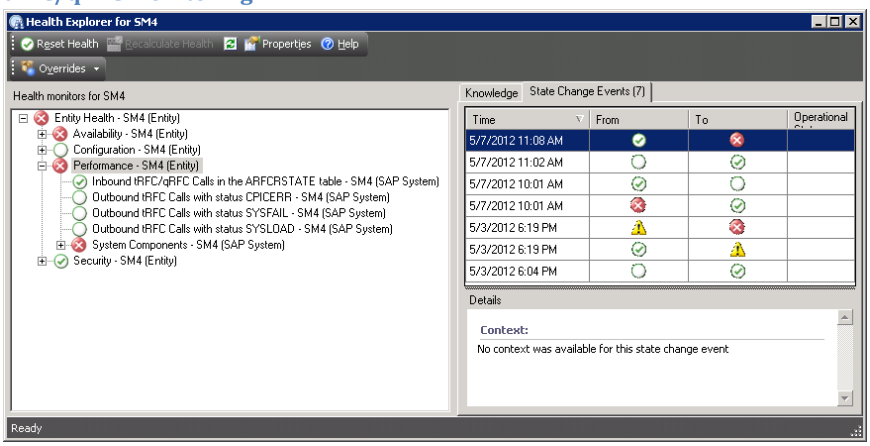


Figure 62. tRFC/qRFC Monitors

SAP Database Monitoring

The Management Pack integrates monitoring of Microsoft SQL Server, Oracle and DB2 (UDB). You can see all SAP Databases across all SAP system under **Databases** view:

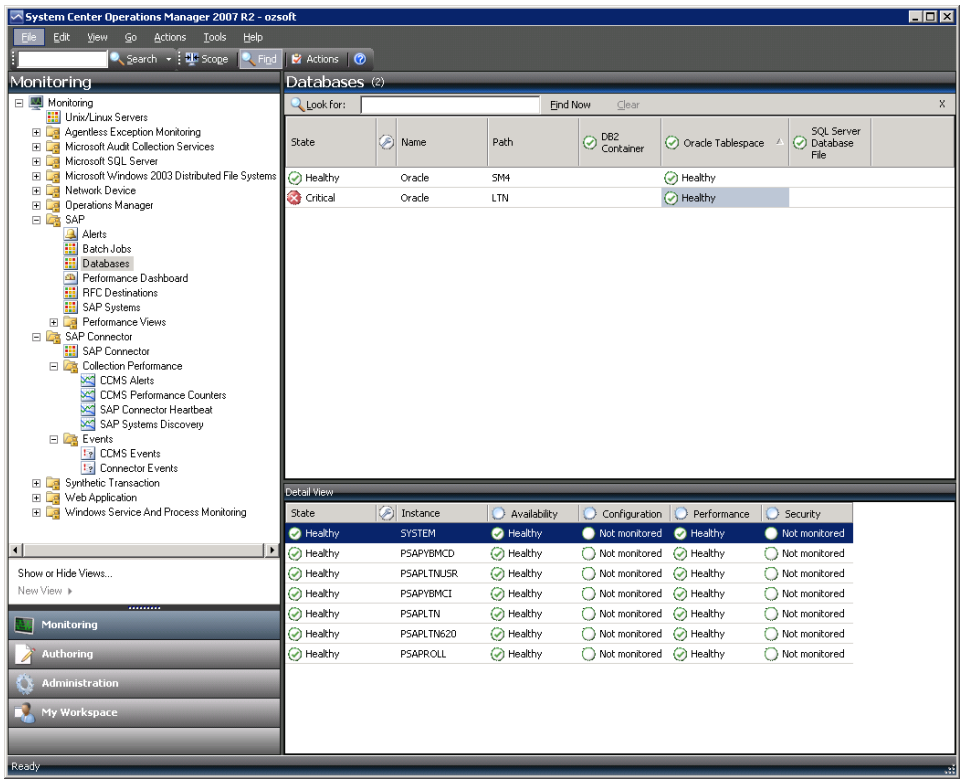


Figure 63. Database Monitoring View

All monitoring is performed through CCMS and does not require any configuration besides the CCMS Monitors:

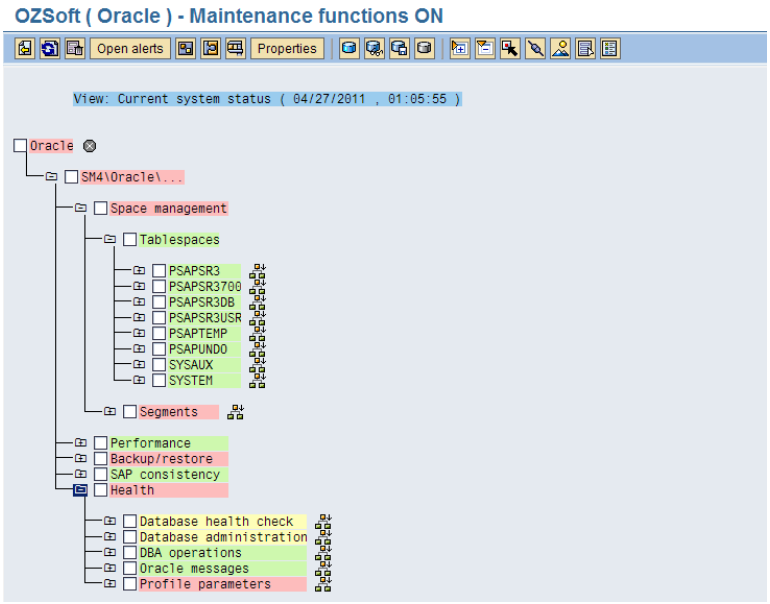


Figure 64. CCMS: Oracle Database Monitoring

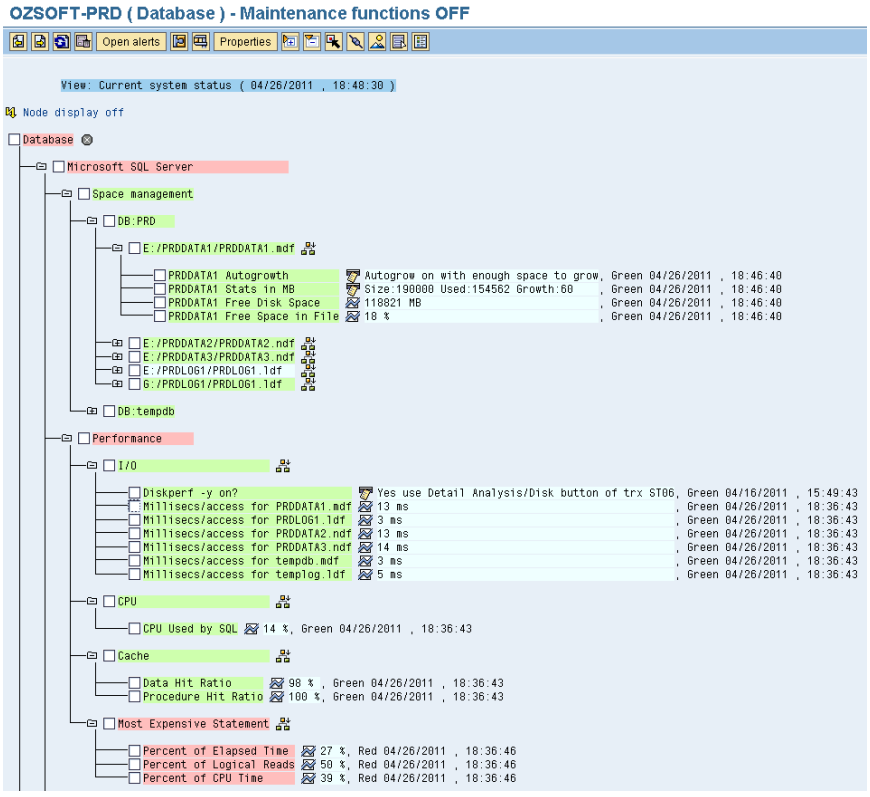


Figure 65 CCMS: MSSQL Database Monitoring

Figure 66. CCMS: DB2 Database Monitoring

The Management Pack interprets CCMS Metrics and creates objects representing Tablespaces, Containers and Database Files (for Oracle, DB2 and MSSQL respectively). A number of Availability and Performance Monitors are attached to Database and Tablespace objects:

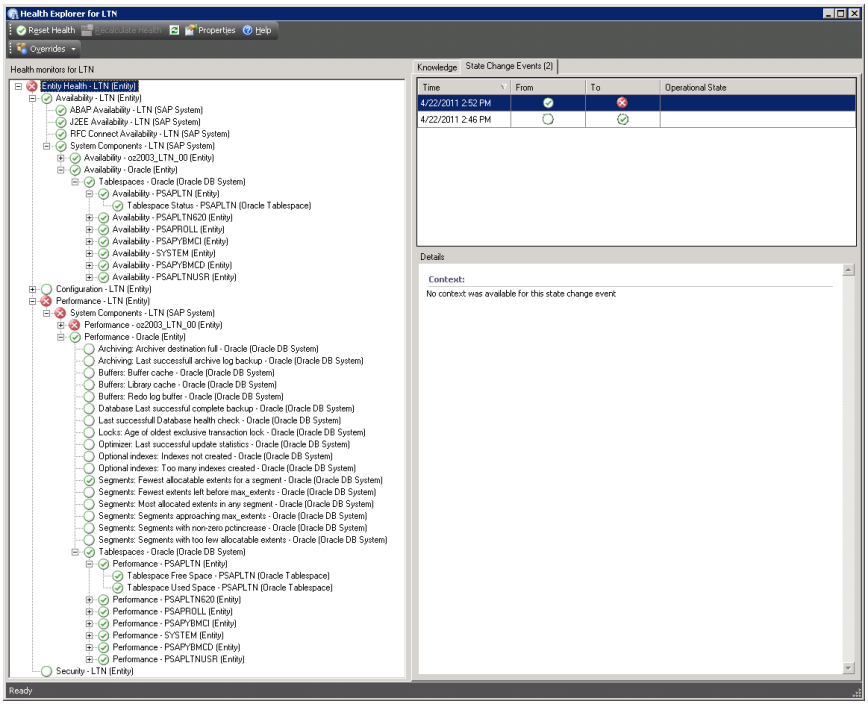


Figure 67. SAP Oracle Monitors

Make sure you enable desired monitors through overrides as all of them are disabled by default.

BW Process Chain Monitoring

For SAP Business Information Warehouse (BW) Systems, the Management Pack support **Active Process Chains Monitoring** (see SAP Configuration: BW Process Chain Monitoring) as well as **Passive Process Chain Discovery**.

In order to enable Process Chain Monitoring you need to import the new *SAP Management Pack BW Monitoring Add-On* management pack located in <Installation folder>\scom\ozsoft.sap.bw.mp.

The Add-On Management Pack creates *BW Process Chains* State view that lists all discovered Process Chains across all the SAP Systems

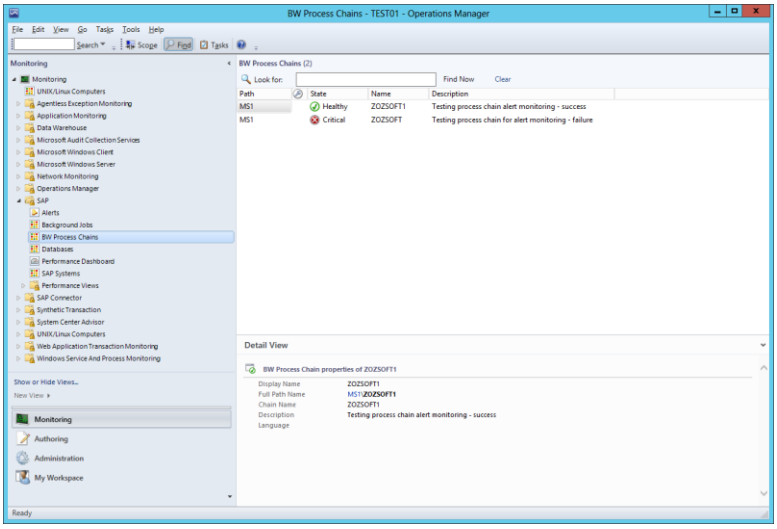


Figure 68. Process Chains View

Active Process Chains Monitoring

This method utilizes BW RSPC APIs and is only supported for directly connected SAP systems

Based on the configured Process Chain masks in the SAP Configuration, the connector periodically connects to BW system retrieves the list of matching Process Chains, analyzes their status and updates Performance Counters for each Process Chain.

The Process Chain monitoring interval is configured in the Configuration utility Scheduling tab (Process Chains field).

Process Chain SCOM Objects have several Monitors defined:

Monitor	Description
Status	Process Chain status 0. Active 1. Completed Successfully 2. Framework Error Upon Completion (e.g. follow-on job missing) 3. Canceled 4. Failed
Runtime	In-flight execution time (seconds)
Duration	Total execution time on completion (seconds)
Wait	Total Wait time for all processes in the chain (seconds)

Table 5. Process Chain Monitors

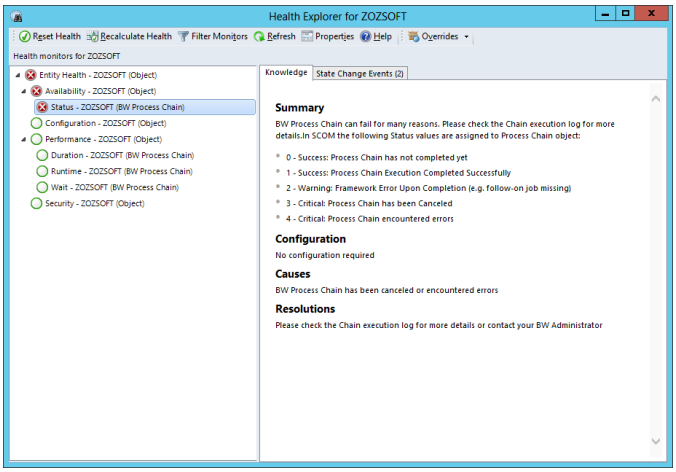


Figure 69. Process Chain Monitors

All Monitors have the Alerting enabled.

Passive Process Chain Discovery

This method intercepts Process Chain termination alerts, extracts Process Chain information and creates SCOM Process Chain Object if it does not already exist. The alerts are associated with the object to simplify subscription and alert management:

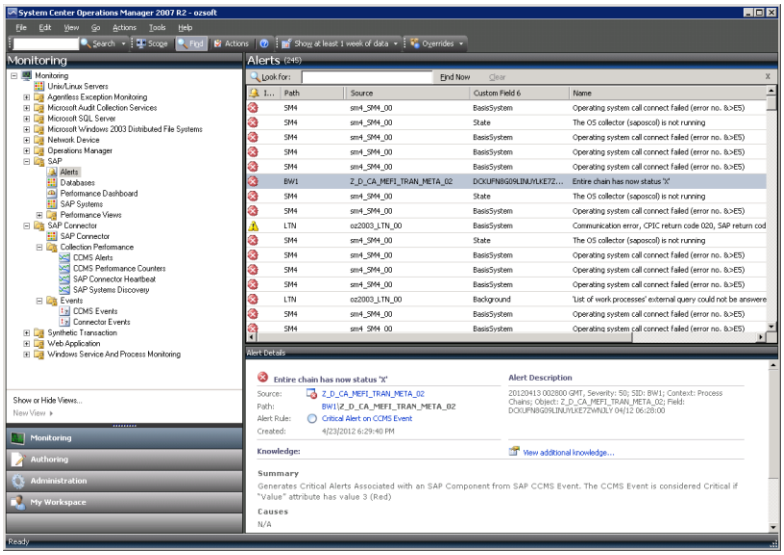


Figure 70. BW Process Chain Alerts

Active Process Chain Monitoring and Passive Process Chain discovery can coexist, with Process Chain Object not monitored actively staying in “Not-Monitored” state.

J2EE Monitoring

The Management Pack integrates SAP J2EE monitoring. For dual-stack systems no additional SAP configuration is required besides the selection of a proper CCMS Monitor. For standalone SAP J2EE systems we recommend using OZSoft SAP Host Control Add-On Management Pack that performs J2EE Monitoring directly. Alternatively the standalone Java J2EE system can be configured to integrate with Central CCMS System (CEN) then including the proper Monitor Set will enable SAP Management Pack to monitoring.

Java Processes Monitoring

The Management Pack supports Java AS' Java Processes monitoring. All Java Processes are automatically discovered and represented by separate objects. Pre-configured SCOM monitors for **CPU Usage**, **GC Duration**, **Memory Size of Local Objects** and **Number of Process Restarts** are included. All relevant alerts are associated with the proper Java Process object.

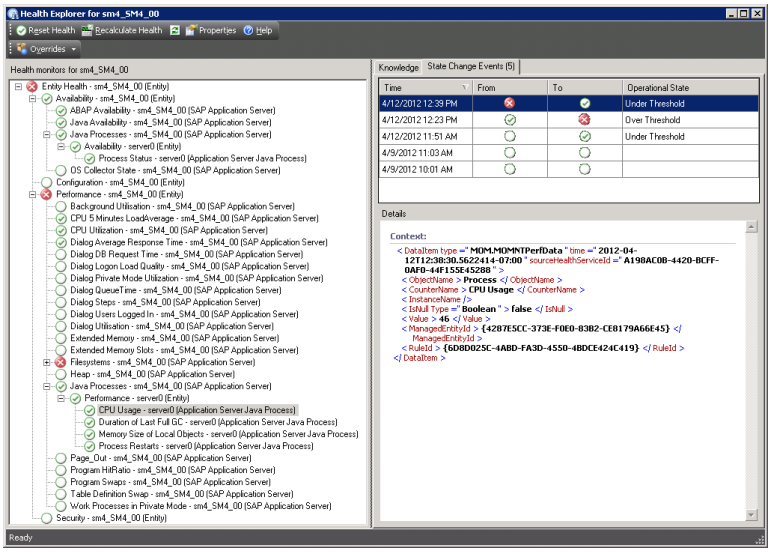


Figure 71 Java AS Java Processes Health

J2EE Engine Monitoring

The Management Pack supports SAP J2EE Engine Monitoring. All J2EE Engines are automatically discovered and represented by separate objects.

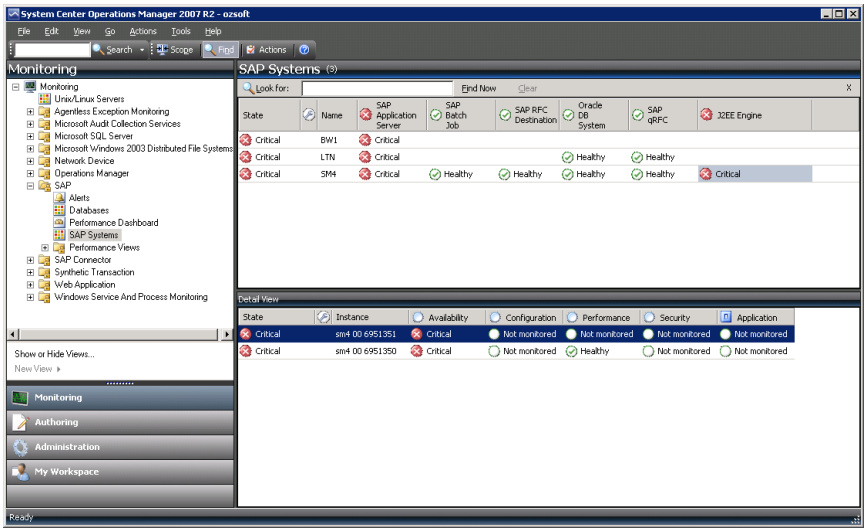


Figure 72 J2EE Engines Monitoring

J2EE Engine's key performance and availability indicators are monitored with a number of pre-configured SCOM monitors.

For each J2EE Engine the hosted applications are discovered and theirs **Unsuccessful Logon Attempts** are monitored through corresponding SCOM Monitors.

All relevant alerts are associated with the proper J2EE Engine or Application.

A Java AS Process hosting the J2EE Engine is matched and dependency monitor is added, enabling the root cause analysis

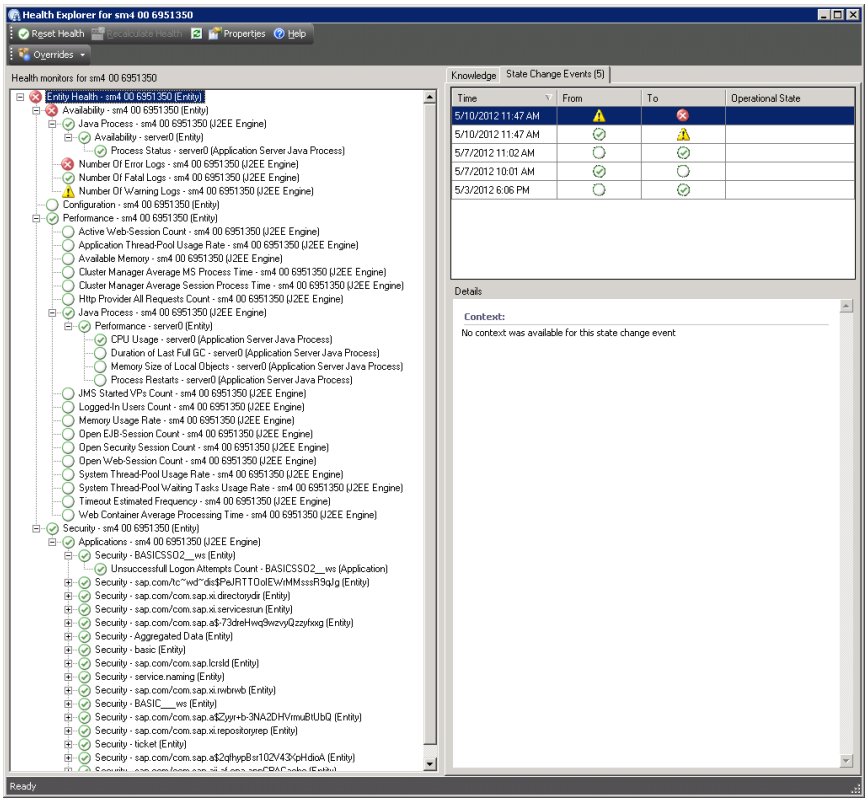


Figure 73. J2EE Engine Health

Web Service Context Monitoring

SAP Management Pack discovers a single **Web Service Context** object for each SAP System.

The following Monitors are included:

Target Object	Monitor Name	Description
Web Service System Context	Application Errors	Monitors the number of Application errors
Web Service System Context	PAF Errors	Monitors the number of PAF errors
Web Service System Context	Core Errors	Monitors the number of Core errors
Web Service System Context	Endpoint Errors	Monitors the number of Endpoint errors
Web Service System Context	MSGPersist Errors	Monitors the number of MSGPersist errors
Web Service System Context	SAPMSGID Errors	Monitors the number of SAPMSGID errors
Web Service System Context	Security Errors	Monitors the number of Security errors
Web Service System Context	Sequencing Errors	Monitors the number of Sequencing errors
Web Service System Context	Serializing Errors	Monitors the number of Serializing errors
Web Service System Context	Session Errors	Monitors the number of Session errors
Web Service System Context	WSA Errors	Monitors the number of WSA errors
Web Service System Context	WSRM Errors	Monitors the number of WSRM errors
Web Service System Context	XIADDR Errors	Monitors the number of XIADDR errors

Table 6. Web Service Context Monitors

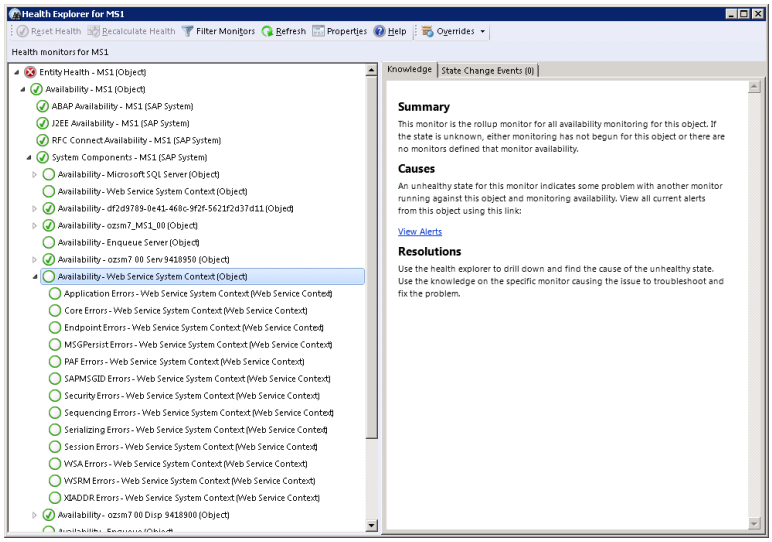


Figure 74. Web Service System Context Monitoring

PI Monitoring

The Management Pack integrates monitoring of SAP NetWeaver Process Integration (PI) systems. PI systems are dual-stack and no additional SAP configuration is required besides the selection of a proper CCMS Monitor.

XI Services Monitoring

The Management Pack integrates PI XI Services monitoring. All XI Services are automatically discovered and represented by separate objects. **Availability** and **Heartbeat** SCOM monitors are included. All relevant alerts are associated with the proper XI Service object.

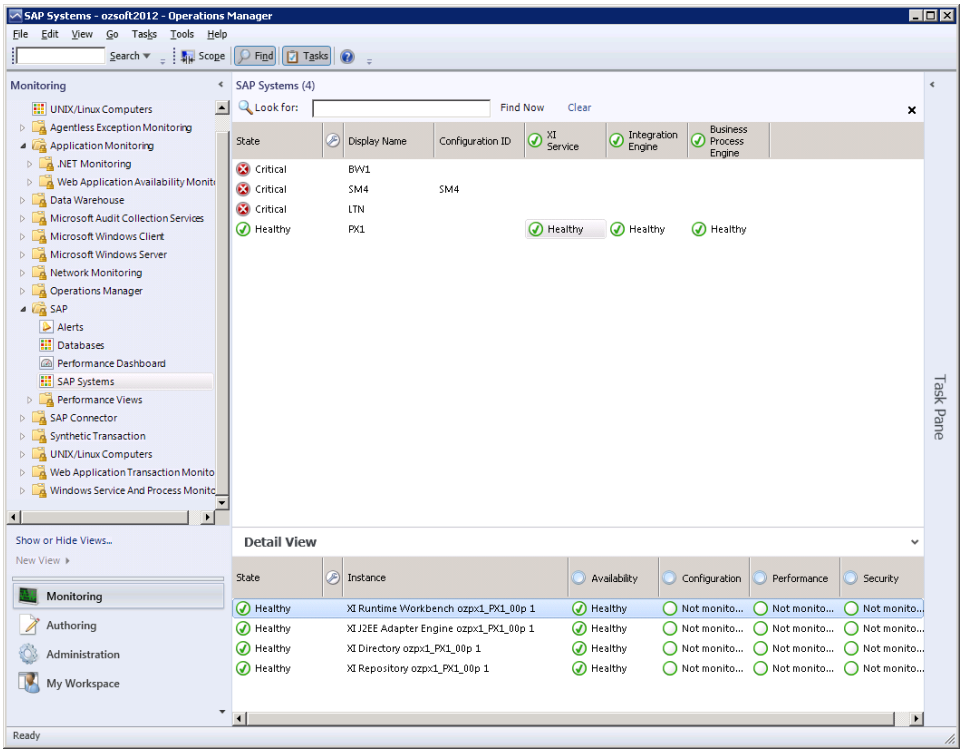


Figure 75. XI Services Monitoring

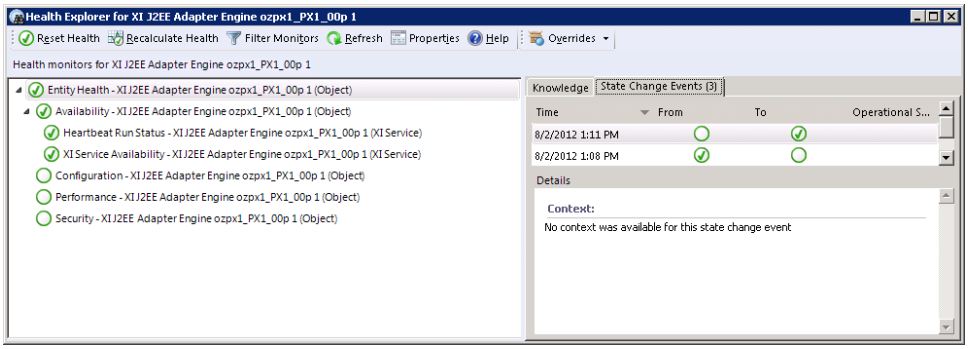


Figure 76. XI Service Health

Integration Engine Monitoring

The Management Pack integrates PI Integration Engine monitoring. All Integration Engines are automatically discovered and represented by separate objects. The SCOM monitors of **Error Frequency** for various components as well as the **Total Message count** are included. All relevant alerts are associated with the proper Integration Engine object.

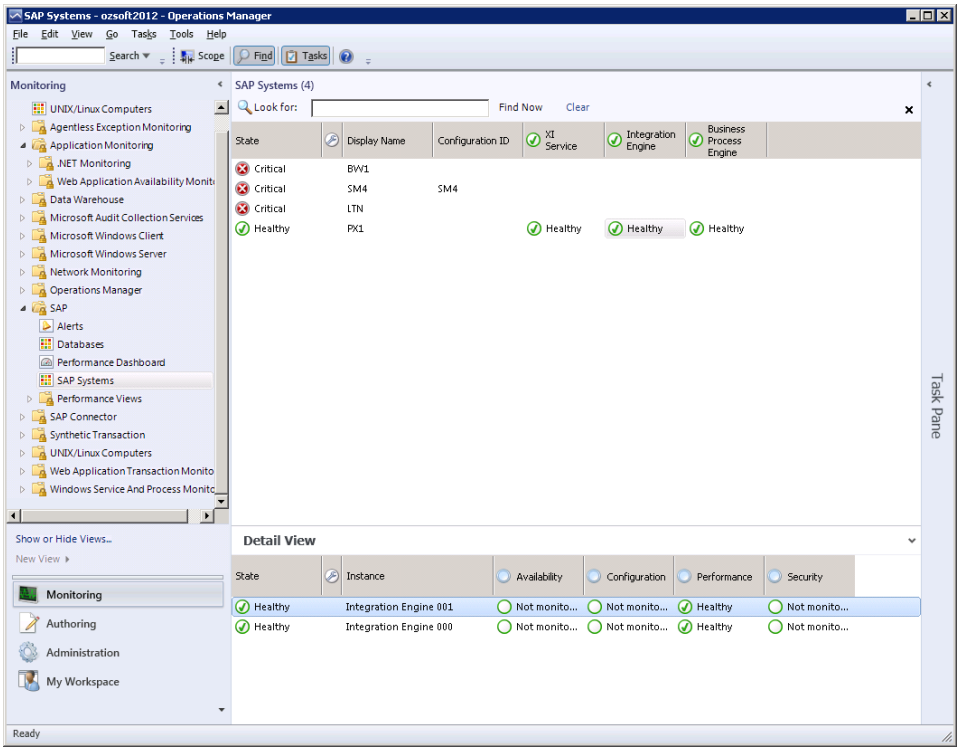


Figure 77. Integration Engine Monitoring

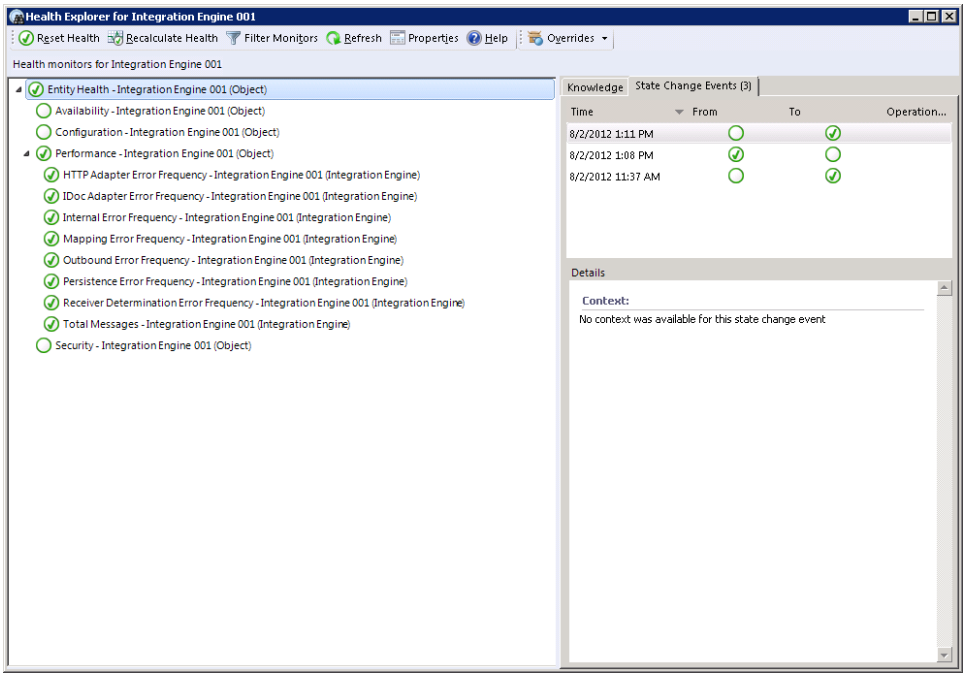


Figure 78. Integration Engine Health

Business Process Engine Monitoring

The Management Pack supports Business Process Engine monitoring. All Business Process Engines are automatically discovered and represented by separate objects. A number of SCOM monitors for various components are included. All relevant alerts are associated with the proper Business Process Engine object.

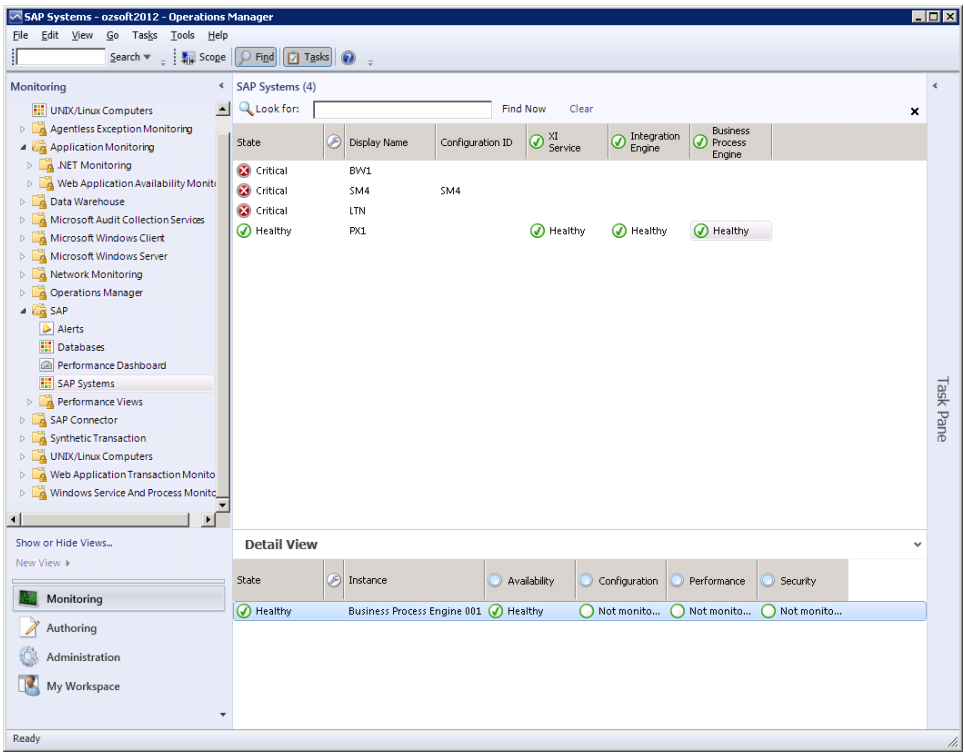


Figure 79. Business Process Engine monitoring

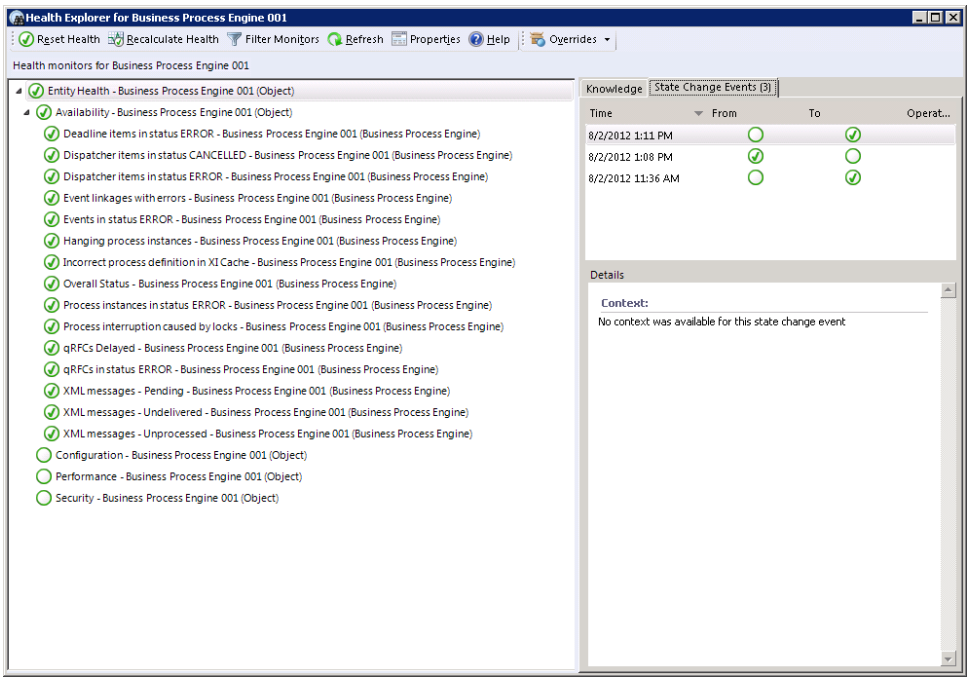


Figure 80. Business Process Engine Health

SAP Synthetic Monitoring

SAP Management Pack supports SAP Synthetic Monitoring based on SAP eCATT.

SAP eCATT Replay Agent is a Windows Service that is installed on one or more Windows machines and allows for the initiation of execution of previously recorded and configured *eCATT Scripts* and *Test Configurations*:

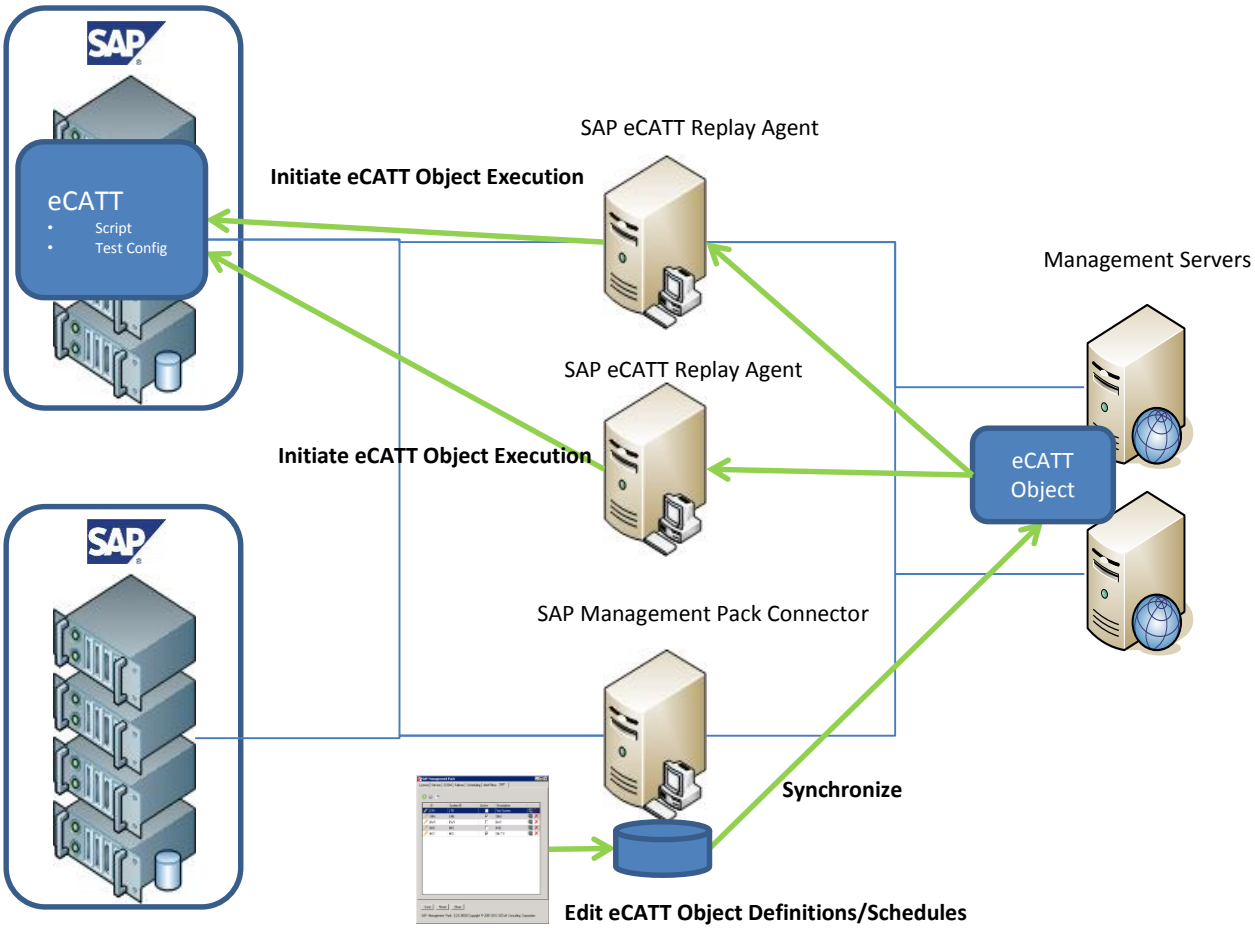


Figure 81. Synthetic Transaction Monitoring with SAP eCATT

Configuration

To configure synthetic monitoring:

On Target SAP System:

1. Using *SECATT* transaction - create new eCATT Script.
2. Record Desired Transactions and add them to the script
   - ! For recorded ***UI Controls*** only **TCD** commands are supported. The Management Pack Synthetic Monitoring **does not** interact with an actual SAPGUI via Scripting APIs and does not support **SAPGUI** recordings.
3. Parameterize the scripts for transaction fields if required
4. Optionally, create Test Configurations and Define Variants that will supply parameter values
   - ! It is Customer's responsibility to define and maintain eCATT definitions. If requested OZSoft will provide eCATT configuration service at the standard rates

On Replay System(s):

1. Install eCATT Replay Agent component. You can install Replay Agent together with SAP Management Pack Connector as well as separately on several other windows computers depending on synthetic monitoring requirements:

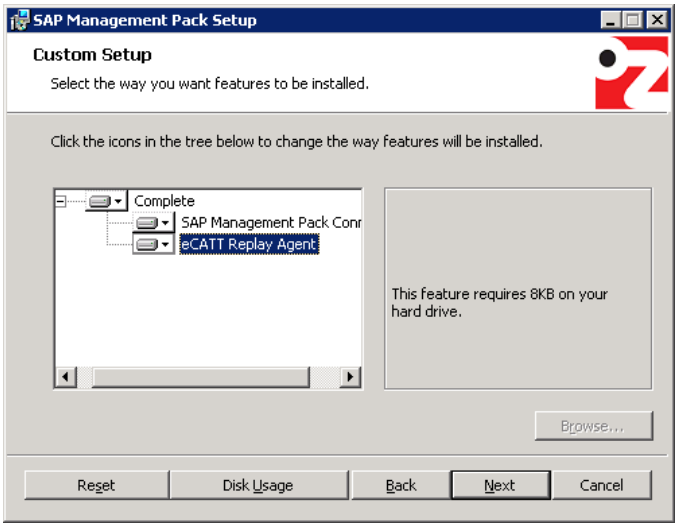


Figure 82. Installing eCATT Replay Agent

2. On each Replay Agent configure SCOM Connection and make sure eCATT Service is started:

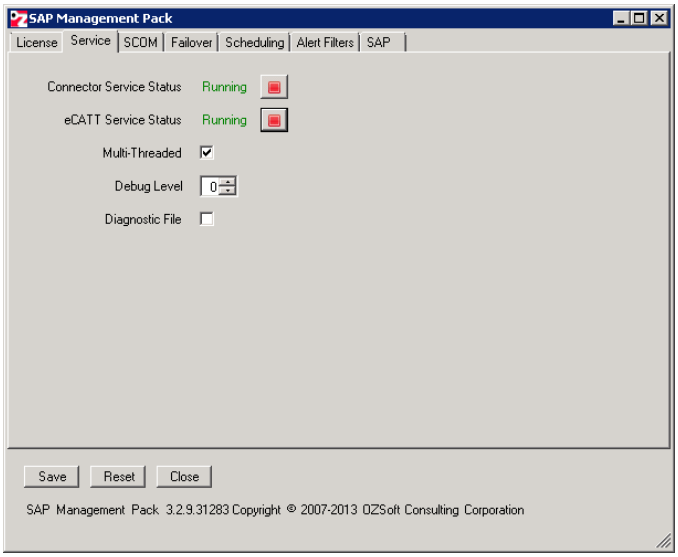


Figure 83. eCATT Replay Service Control

3. On the machine where SAP MP Connector is installed (**Primary** instance, if Failover environment is set up) Open Configuration program and install the new license key that enables Synthetic monitoring. Make sure *Synthetic Monitoring* field is checked:

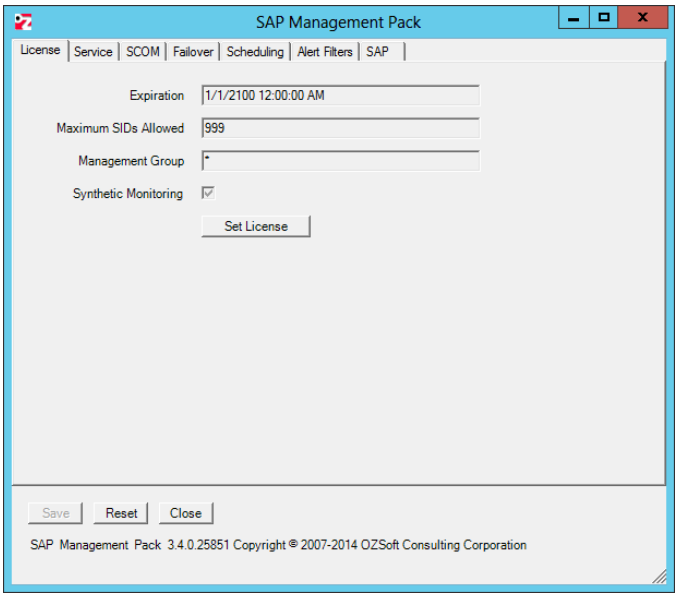


Figure 84. Synthetic Monitoring Licensing

4. Edit the target SAP System definition, switch to eCATT tab:

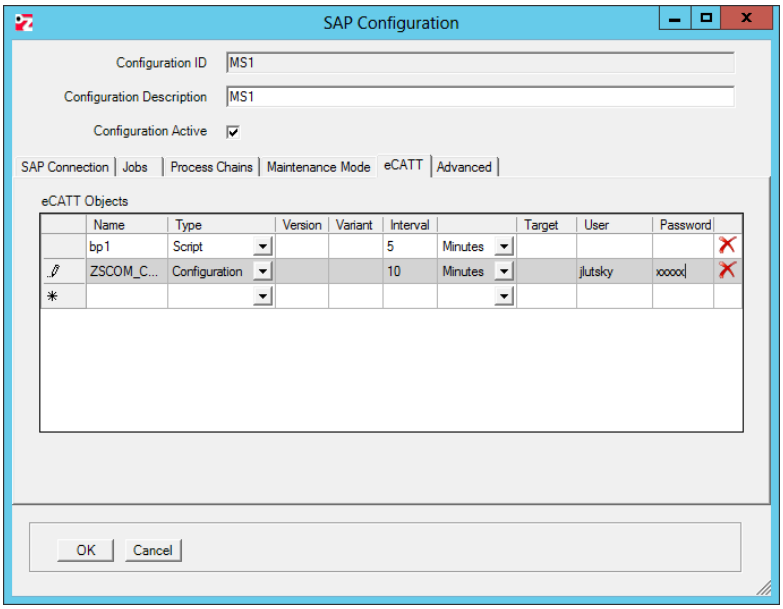


Figure 85. eCATT Objects Configuration

5. Add entries for each desired eCATT Script or Test Configuration invocation:
    a. eCATT Object Name
    b. eCATT Object Type
    c. Script version (Optional - Scripts only)
    d. Variant Name (Optional - Test Configuration only)
    e. Repeat interval/units. The Replay Agents initiate eCATT Object Execution every interval regardless if the prior execution is still running.
    f. Optionally specify Target eCATT Replay Agent computer to initiate eCATT Object Execution (you can use REGEX to target multiple computers or leave blank to target all)

g. Optionally specify User/Password used for eCATT Execution, if left blank the SAP Connection user is used. In either case, the eCATT Execution user must have the appropriate RFC and eCATT authorization

6. Save the configuration.
7. SAP Team must ensure the SAP target system and client has the appropriate parameters and settings to allow eCATT testing
8. Allow up to 5 minutes for the configuration to be uploaded to SCOM. The SAP MP Connector Service has to be running.
9. Open Operations Console.
10. Import *SAP eCATT Synthetic Monitoring Add-On* Management Pack located in *<Installation Folder>\scom\ozsoft.sap.ecatt.mp*.
11. Locate folder ***Synthetic Monitoring*** under SAP Folder, you should see the previously configured eCATT Objects:

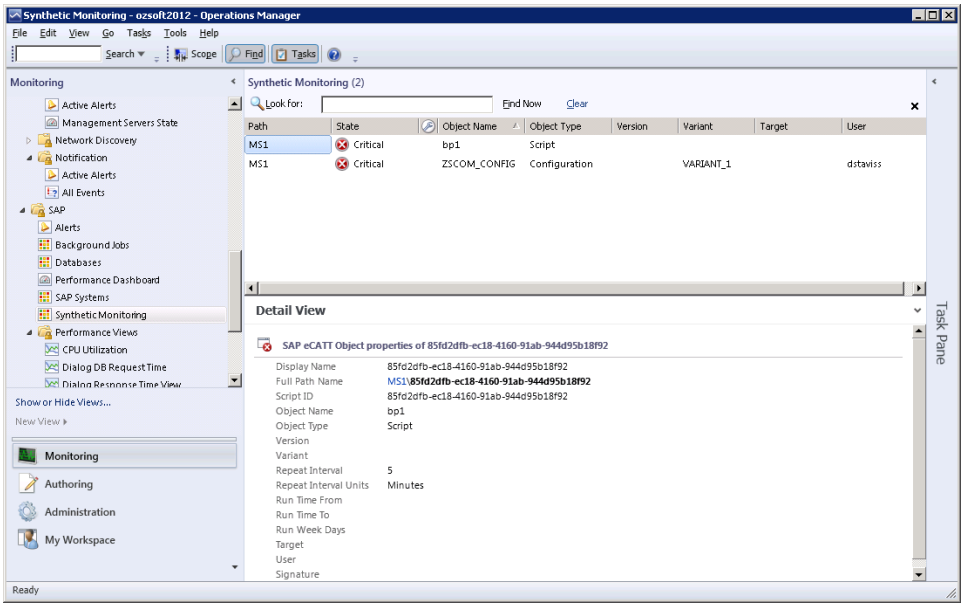


Figure 86. Synthetic Monitoring View

12. Open health Explorer for each object to override the Monitors' thresholds:

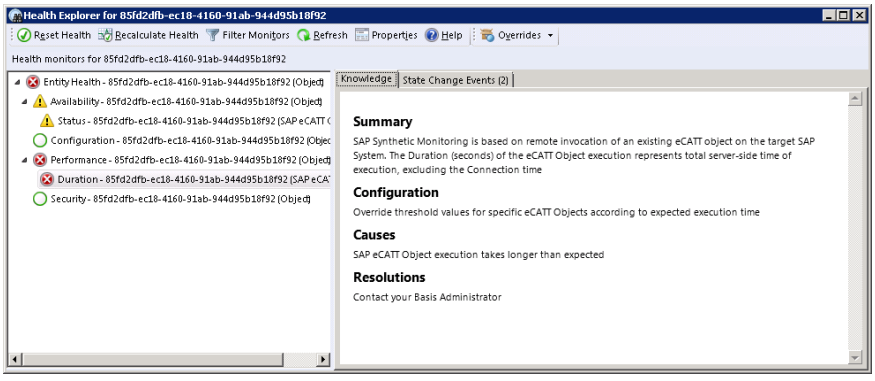


Figure 87. eCATT Object Health Explorer

eCATT User SAP Authorizations

The following authorizations are required for an SAP user to establish an RFC connection to an SAP system and execute eCATT Script or Test Configuration. Additionally, depending on what transactions the eCATT script contains the user will need the appropriate authorizations assigned.

Auth. Object	Values	Reason
S_RFC	RFC_TYPE=FUGR RFC_NAME=(PWP2, RFC1, RFC2, SDDO, SDIFRUNTIME, SG00, SRFC, SYST, SYSU, SIFD, SIMG, SDNT, STUB, ECATT_EXECUTE, ECATT_LOG) ACTVT=16	RFC Calls

Table 7. eCATT SAP Authorizations

Reporting

The Management Pack does not include any custom reports, however we supply the rules needed to publish the performance counters data to the Data Warehouse. Configuring and generating the reports using Microsoft Generic Report Library is very straightforward. In cases where there is a need to generate the report for the performance counter that the Management Pack has no preconfigured DW rule for, a custom rule can be added easily please refer to Appendix for more details.

Here are the steps needed to create a report utilizing Microsoft Generic Report Library:

1. Identify the performance counter you would like to build the report for.
   Example: **App Server CPU/5minLoadAverage**
2. Verify that there is a preconfigured DW publishing rule for the selected performance counter. See Figure 43. Alert Rules - look for rules with the name starting as "DW SAP…"
3. Make sure the rule is enabled. Create override if needed:

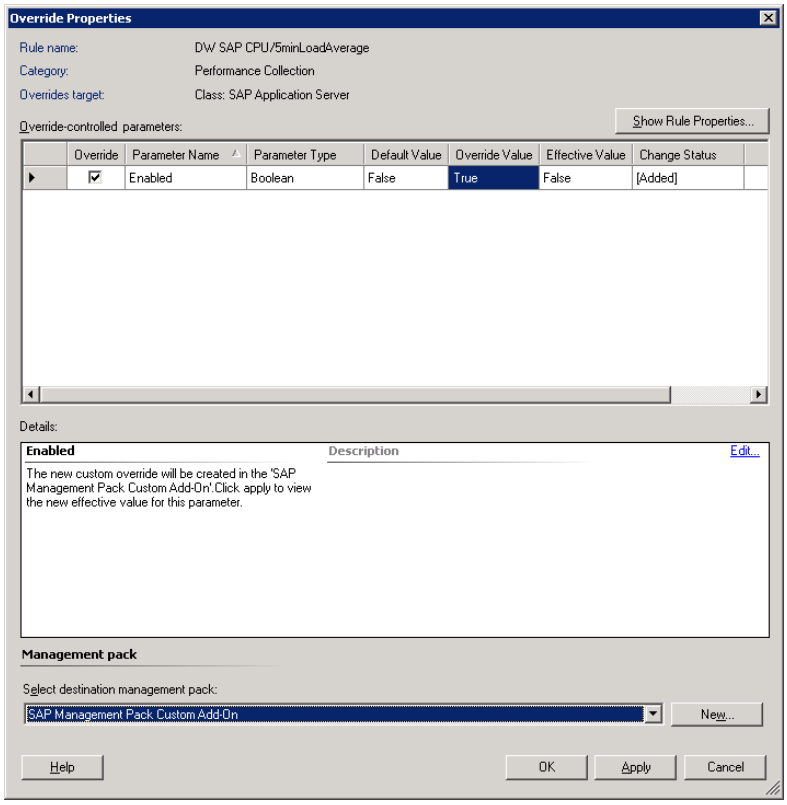


Figure 88. Override DW Rule to enable

4. Switch to the reporting view, select using Microsoft Generic Report Library, click on Performance:

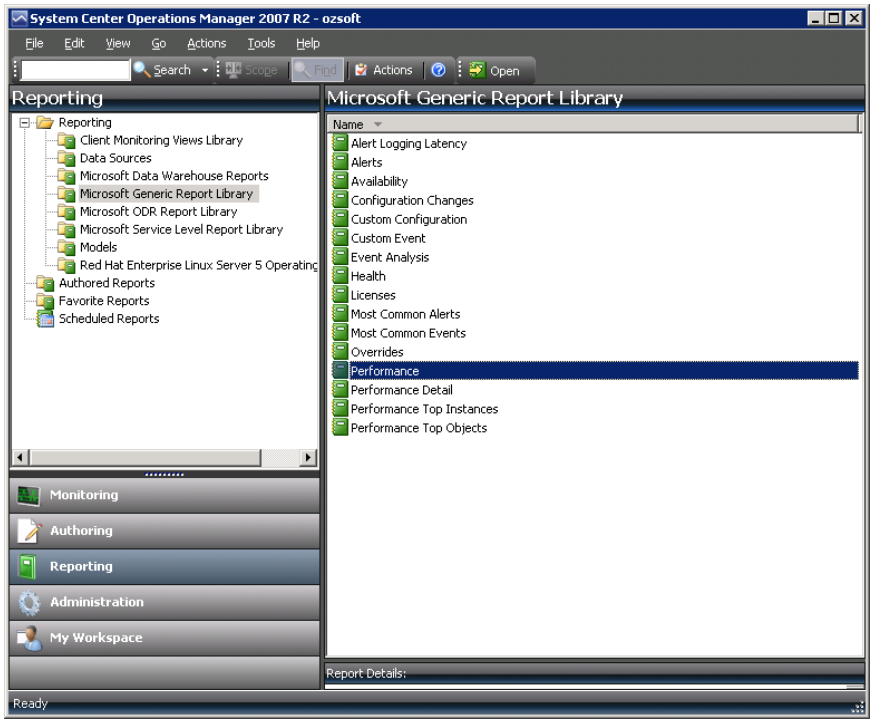


Figure 89. Microsoft Generic Report Library

5. Configure the report

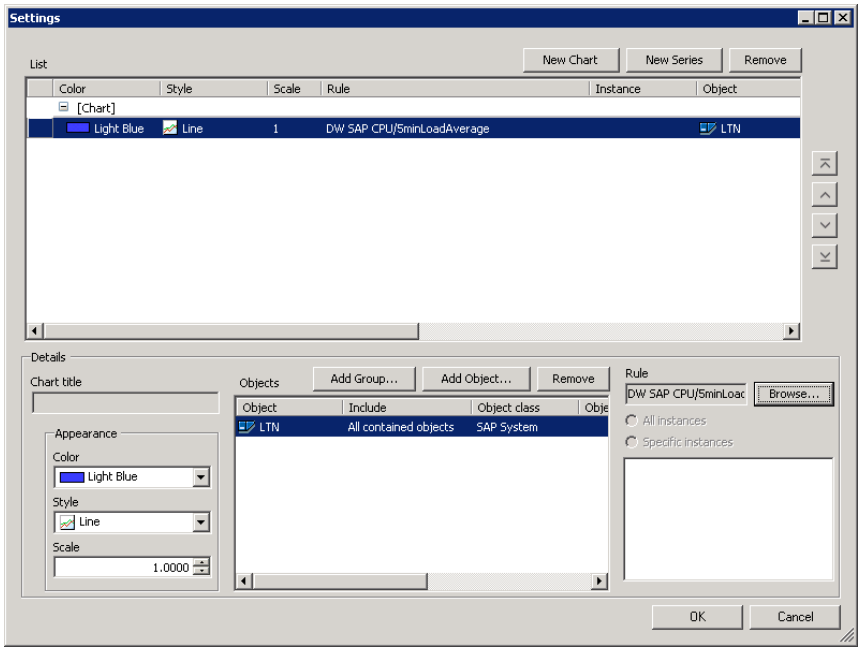


Figure 90. Configure Report

When targeting the App Server counters, use Add Group, select the SAP System object so all App Servers are included automatically.
Select the appropriate DW rule:

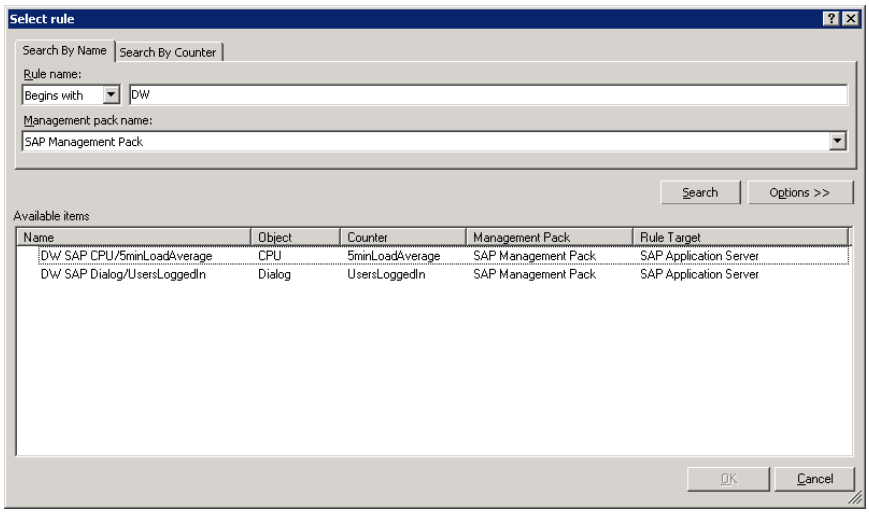


Figure 91 Select DW Rule

6. Run the report:

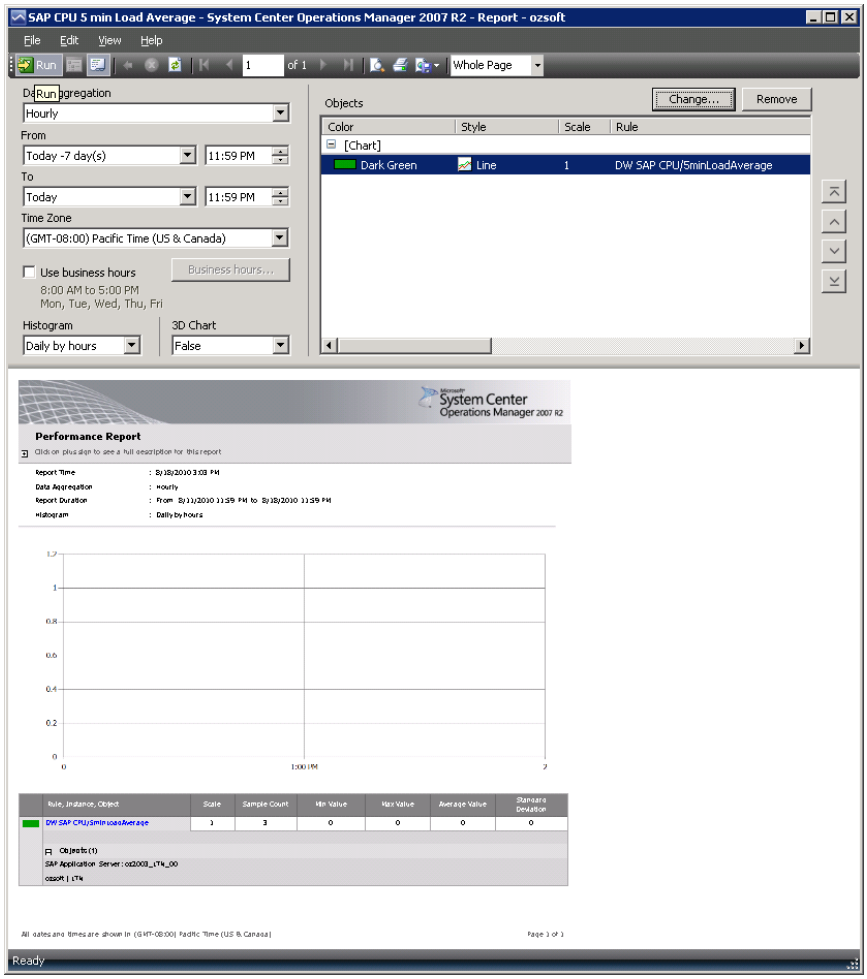


Figure 92. Running the Report for the first time

7. Save the report - File->Publish:

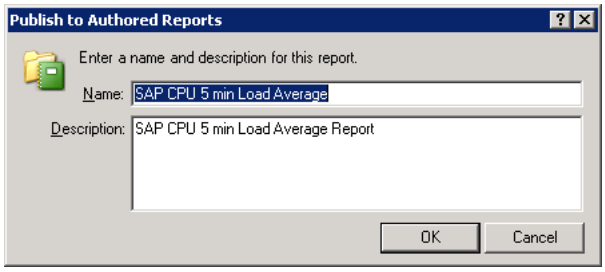


Figure 93. Publish Report

8. Run or Schedule Published Reports

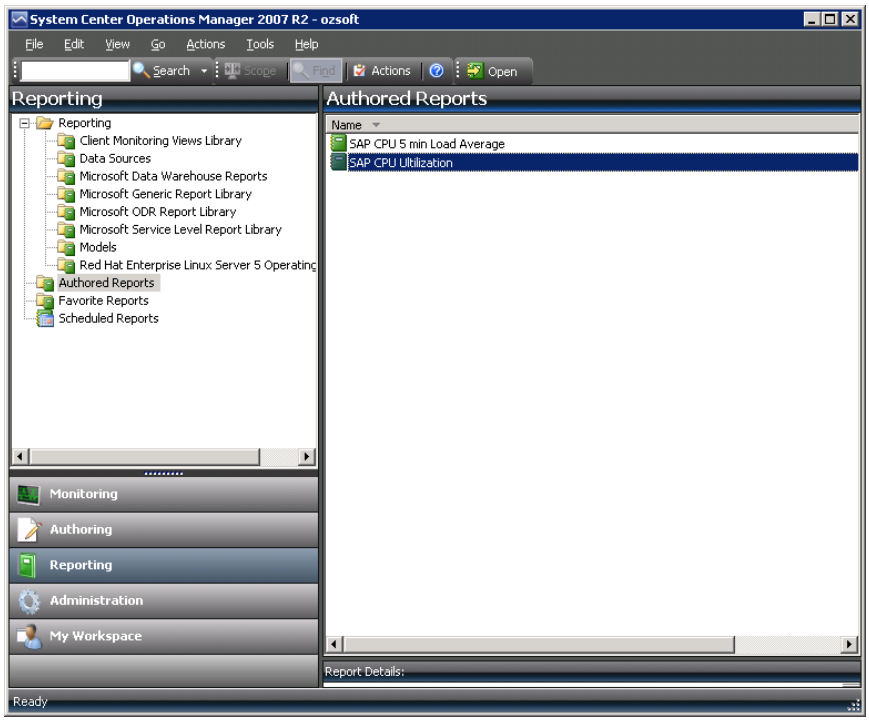


Figure 94. Published Reports

! The minimum data aggregation interval is 1 hour - allow for several hours after enabling the DW rule for the meaningful data to show up.

9. Repeat as needed for the additional Performance Counters and SAP System

Monitoring SAP Connector

SAP Management Pack includes a number of self-monitoring facilities

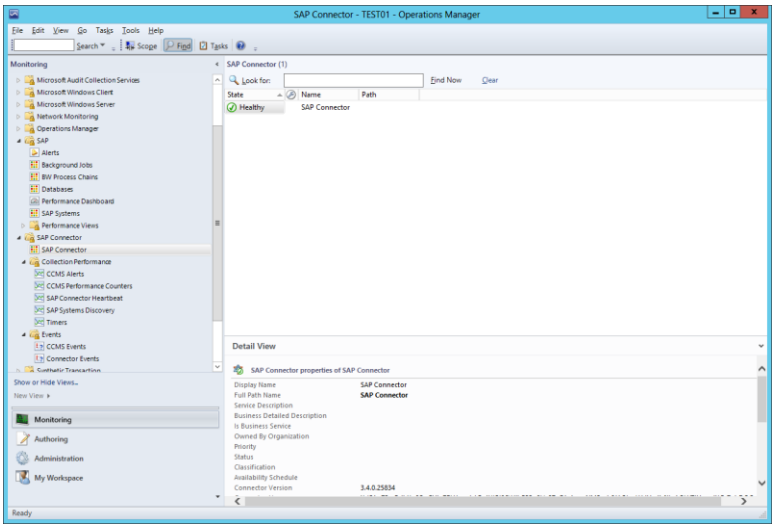


Figure 95. SAP Connector State View

The SAP Connector view is a convenient way to access SAP Connector monitoring. Open Health Explorer for the Connector object to drill down to specific monitors.

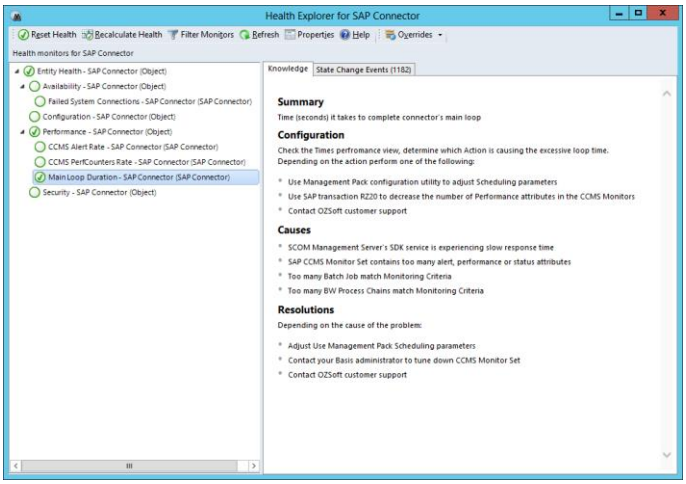


Figure 96. SAP Connector Monitors

Under "*SAP Connector"* folder there is a new performance view "Timers":

Alert Rate Monitor – monitors the number of CCMS Events inserted into SCOM by SAP Connector. The default threshold for triggering Critical state is 100.

PerfCounters Rate Monitor – monitors the number of CCMS Performance Counters inserted into SCOM by SAP Connector. The default threshold for triggering Critical state is 200.

Failed System Connections Monitor – monitors the number of failed SAP Connections in SAP Connector. The default threshold for triggering Critical state is 1.

Main Loop Duration Monitor – monitors the duration of the Connector's main loop. The default thresholds for triggering Warning and Critical states are 300 and 600 seconds respectively.

The following Performance Views are supplied:

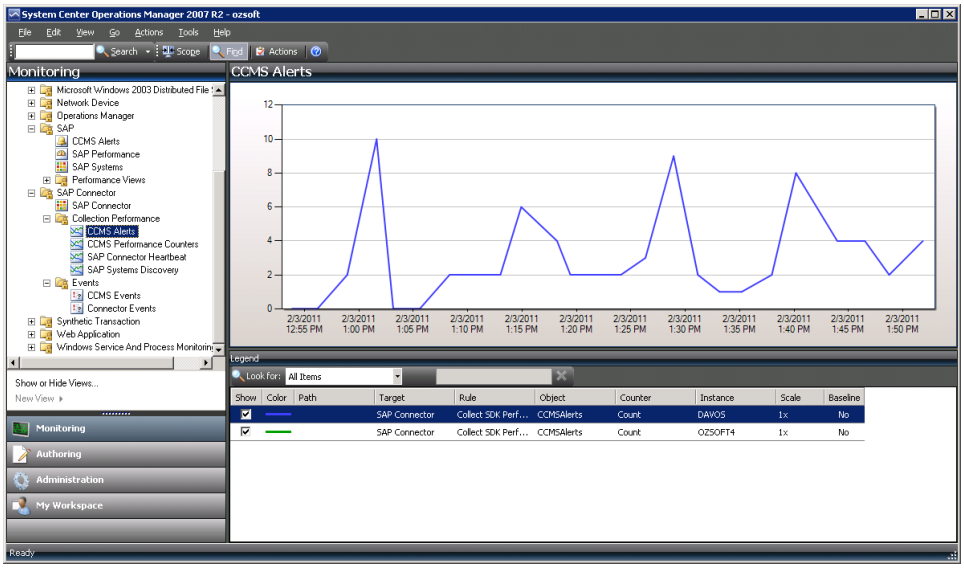


Figure 97. CCMS Alerts Rate

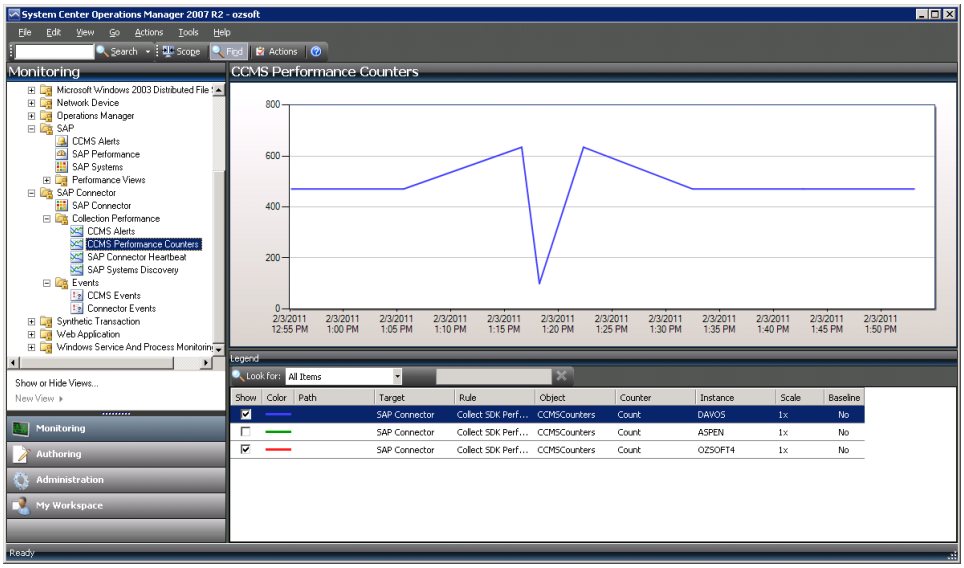


Figure 98. CCMS Performance Counters Rate

When the SAP Connector is configured as a Fail-over Primary, the heartbeat Performance Counter is posted every interval. The heartbeat is monitored by the Failover Standby (s) Connectors. The Standby Connector instance will take over if the counter's last sample is older that the specified threshold.

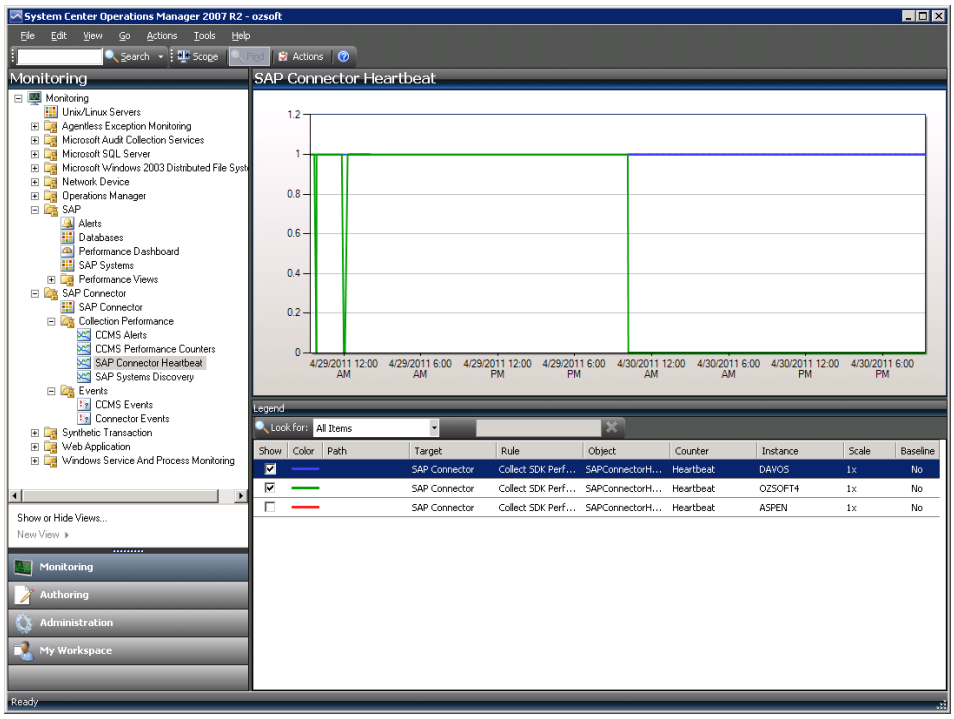


Figure 99. SAP Connector Heartbeat

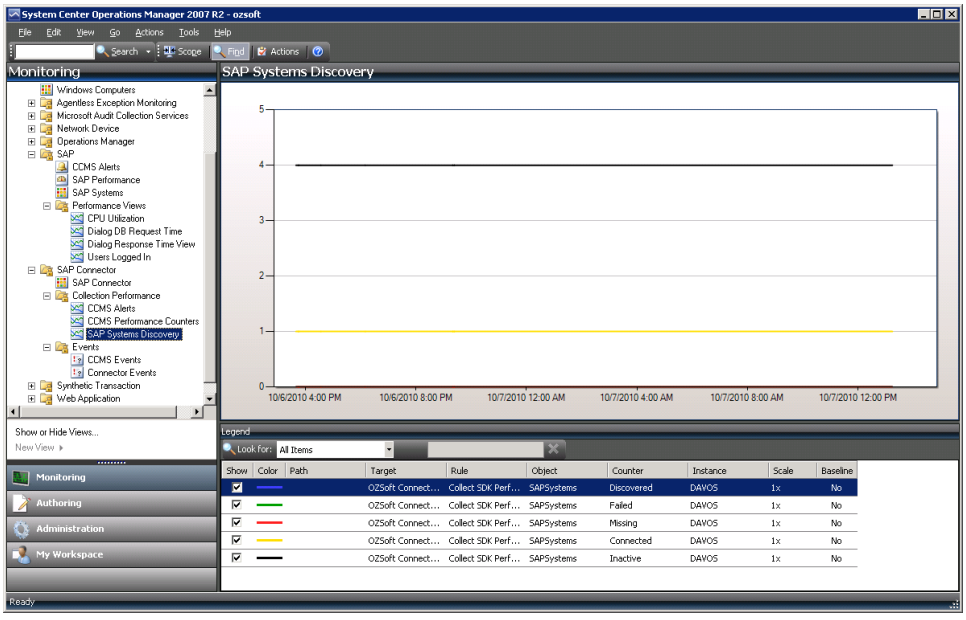


Figure 100. System Discovery Metrics

The *Timers* view displays times that different operations are taking to complete.

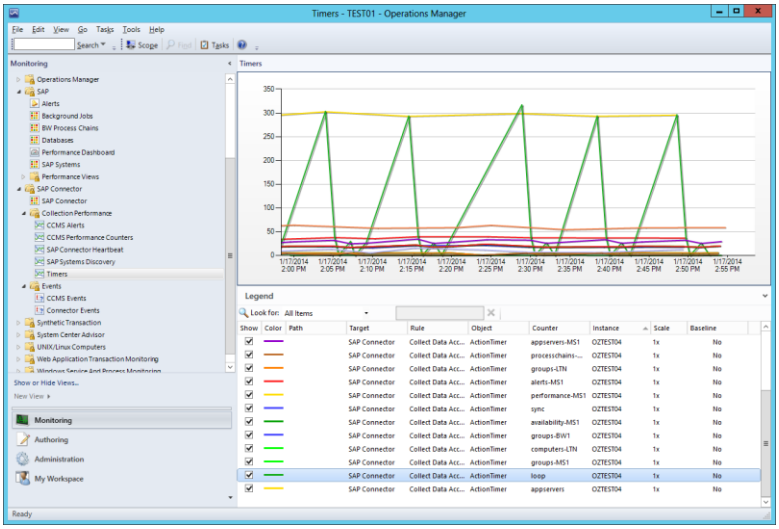


Figure 101. SCOM Connector Timers View

CCMS Events

You can view the raw CCMS Events in *CCMS Events* view:

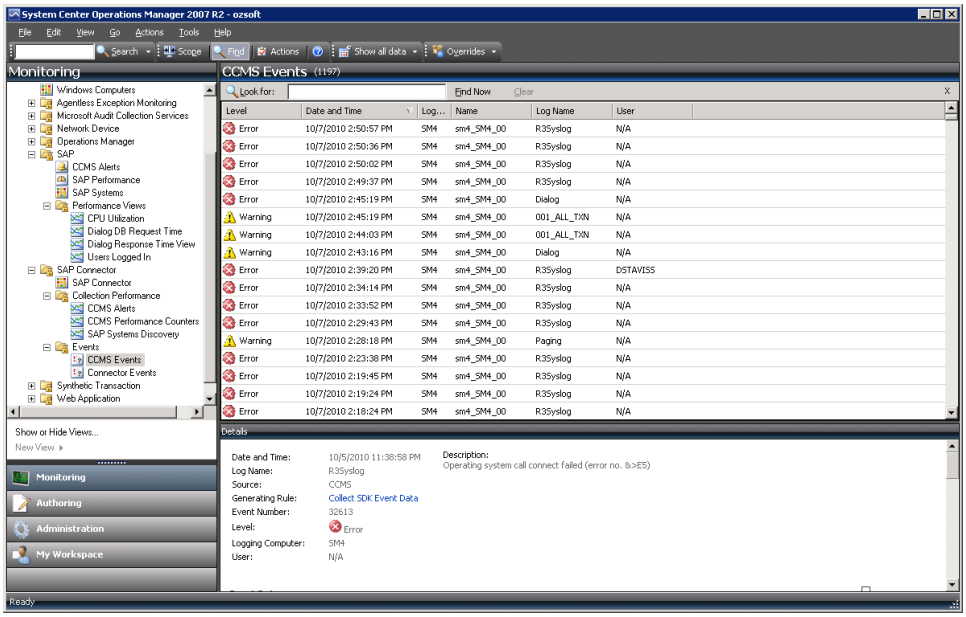


Figure 102. CCMS Events View

Connector Events

You can view raw SAP Connector events in Connector Events view:

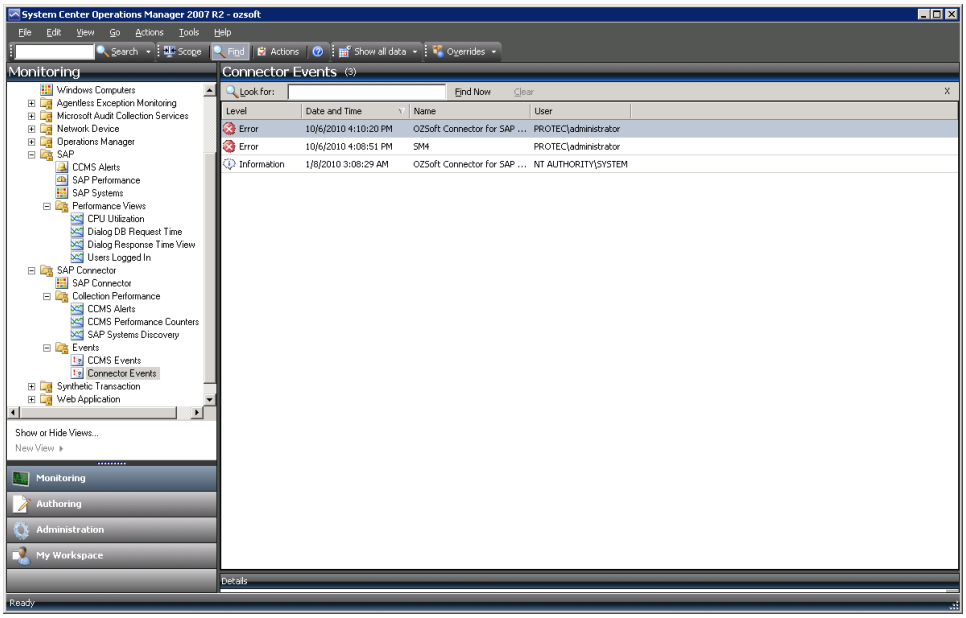


Figure 103. SAP Connector Events View

Contact Information

You can contact OZSoft Consulting at the following e-mails addresses:

Technical support: support@ozsoft-consulting.com

Sales and Marketing: sales@ozsoft-consulting.com

You can also visit our web site at http://www.ozsoft-consulting.com for more information about OZSoft Consulting Corporation, the SAP Performance Management Specialist

Appendix A

SAP Connection Properties

Property Name	Description
SYSID	SAP-logon System ID (Only required for Load Balancing)
SYSNR	R/3 system number (R/3, No Load Balancing)
CLIENT	SAP logon client
USER	SAP logon user
PASSWD	SAP logon password
LANG	SAP logon language (1-byte SAP language or 2-byte ISO language)
TRACE	RFC trace (0/1: without/with trace, Def. 0)
ASHOST	Host name of a specific application server (R/3, No Load Balancing)
ASSERV	Service of the application server (optional)
MSHOST	Host name of the Message Server (if using Load Balancing)
MSSERV	Service of the Message Server (if using Load Balancing)
GROUP	Name of the group of application servers (if using Load Balancing)
SAPROUTER	SAPRouter parameters if the connection needs to be made through a firewall via a SAPRouter: /H/<host name>[/S/<port number>]
NO_COMPRESSION	By default the RFC protocol compresses tables when they reach a size of 8KB or more (0/1, Def. 0)
PASSWORD_CHANGE_ENFORCED	If the backend profile parameter rfc/reject_expired_passwd is set to "0", this flag has the following effect: 0: logs in using the provided initial password. 1: login fails. If the profile parameter is set to "1", login will fail no matter how you set the flag.

Table 8. SAP Connection Properties

- ! Please make sure that if you choose to connect to SAP system using the message server the Properties **SYSID**, **MSHOST** and optionally **MSSERV** and **GROUP** have to be provided. The simplest way to connect is a direct connection to the Application server- you will need to provide the following properties **CLIENT, SYSNR, ASHOST, USER** and **PASSWORD**
- ! Always consult your Basis administrator when selecting the way to connect to an SAP system

Appendix B

SAP Monitor Definitions

In order to speed up the implementation of SAP monitoring with the Management Pack we now supply several SAP Monitor definitions that include the essential alerts and performance counters.

The Monitor definition import files can be found in ***<Installation Folder>\sap***

These monitor definitions are provided:

MonitorAvailability.XML

MonitorBasis.XML

MonitorOracle.XML

MonitorJ2EE.xml

MonitorPI.xml

MonitorBW.xml

MonitorEnqueue.xml

MonitorALE.xml

The files are to be imported into SAP CCMS. Please follow the following instructions for each monitor definition as needed:

1. Login into SAP with a user that is authorized to use RZ20 transaction
2. Start transaction RZ20
3. Click on ***Extras->"*Activate maintenance function**"
4. Select the ***Monitor Set*** you would like to import the Monitor into, click ***Create*** button
5. Inside the Monitor Definition screen, Click ***Monitor Definition->Import***,
6. Load the file ***<Installation Folder>\sap\Monitor….XML***
7. If you wish to change the default monitor name - click on ***Monitor Definition -> Change Name*** type a new for the monitor
8. Save the monitor

These monitor are Rule-based - they will work transparently for a single system including all application servers or for a Central Monitoring system including all connected systems.

Appendix C

Configuring SAP Background Job Monitoring

You can use the SAP Monitoring architecture to monitor selected jobs and to display problems as alerts. This job monitoring is deactivated by default; the activation is described below.

Select the jobs that are to be monitored

The table ALBTCMON contains name patterns of the jobs that are to be monitored using job monitoring. To monitor the desired jobs, enter the relevant name patterns in the table:

1. Start transaction SE16.
2. The *Data Browser: Initial Screen* screen appears. In the *Table Name* field, enter **`ALBTCMON`** and choose *Table Contents (Enter)* ( ).
3. The *Data Browser: Table ALBCTMON* selection screen appears. Choose *Execute* ( ). To create a new name pattern, choose the *Create* button ( ).
4. The system displays the *Insert Table ALBTCMON* screen. In the *JOBNAME* input field, enter the desired name pattern. In the simplest case, a name pattern can be the name of the job that you want to monitor. You can use the wild card character (*****) to select multiple job names. Leave the other fields empty; they are reserved for future developments.
5. Save your changes.

For each name pattern, the system creates a sub tree, in which it displays information about the status and runtime of the corresponding jobs.

Monitoring jobs with the monitoring architecture is always system-local. If you have a central monitoring system, you must nevertheless always make the selection of the jobs to be monitored in the local system.

Activating the Job Monitoring

By default, Job Monitoring is deactivated. To activate it, you must ensure that the corresponding data collection method starts to collect data automatically. To do this, follow the procedure below:

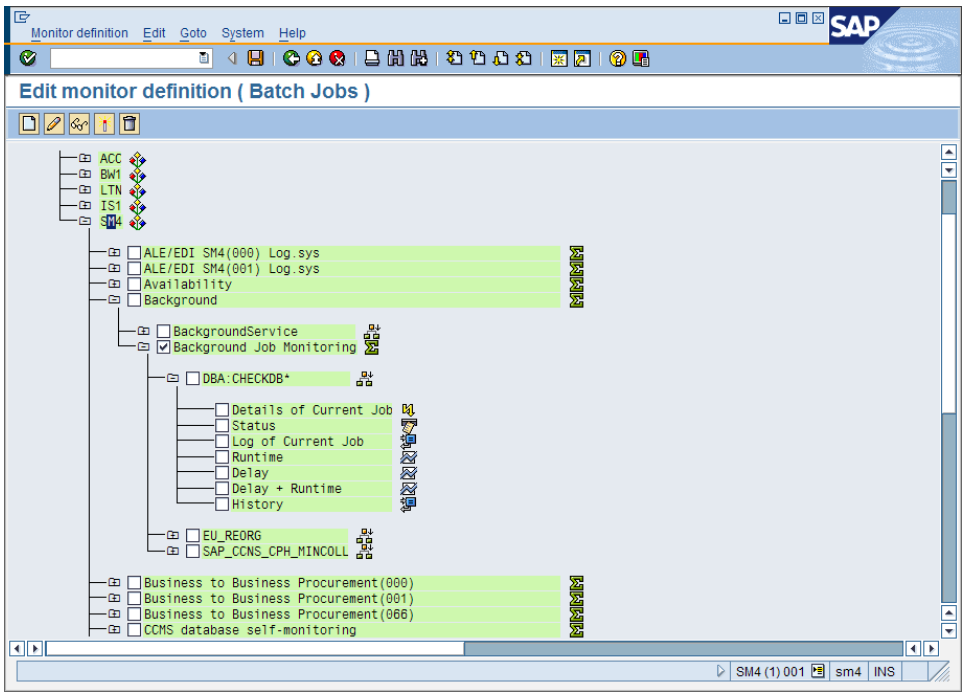
1. From the SAP Easy Access Menu, choose *Tools* → *CCMS* → *Configuration* → *Alert Monitor*, or call transaction RZ21.
2. The *Monitoring: Properties and Methods* screen appears. In the *Methods* group box, select *Method Definitions* and choose *Display Overview*.
3. The system displays an overview of the method definitions. Select the method *CCMS_BATCH_MONITORING* and choose *Edit Data* ( ).
4. The *Monitoring: Methods* screen appears. Choose *Display* ↔ *Change* ( ). Choose the *Control* tab page, and in the *Startup Method* group box, activate the *Execute Method Immediately After Start of a Monitoring Segment* indicator.

Save your changes.

The data collection method will become active at the next restart of the system and will automatically generate the relevant sub trees.

If you require the job monitoring data immediately, you should reset to WARMUP status the monitoring segment of the central server of your system (the server with the Enqueue service).

After activation, the data is available in the context *Background*, *Background Job Monitoring* sub tree. For the monitoring, it is useful to define your own monitor or to extend a monitor definition of your own to display the data:



Appendix D

Configuring SAP RFC Destination Availability Monitoring

Please follow the instruction below to configure the monitoring of availability of a component or a service by pinging its RFC destination: (complete document Monitoring Availability of Services and Components)

1. Start transaction **RZ21**, mark Method definitions, and choose Display overview.
2. Copy the standard **CCMS_RFCDest_Availability_Col** method definition. You will need a separate method definition for each RFC destination that you wish to monitor.
3. Choose the *Parameters* tab and fill out the first two parameters as follows:

Parameter name 1	**RFC_DEST**
Parameter value 1	The name of the RFC destination that should be pinged. The RFC destination can be of any type. Any RFC server can respond to the RFC ping that will be sent to it by way of this destination.
Parameter name 2	**COLL_METHOD**
Parameter value 2	The name that you chose for your new method in step 2.

4. Make sure that the other settings in the method definition are as follows:
   a) Execution Tab

Field	Setting
Type of call	Function module
Call	SALK_RFCDEST_AVAILABILITY
Execute method on	The local server of the MTE to be processed
Execute method for	Individual MTE

   b) Control Tab

Field	Setting
Execute method	periodically in dialog process (short-running program)
Startup method	Execute method immediately after monitoring segment start
Execution location of startup method	Only on the central instance

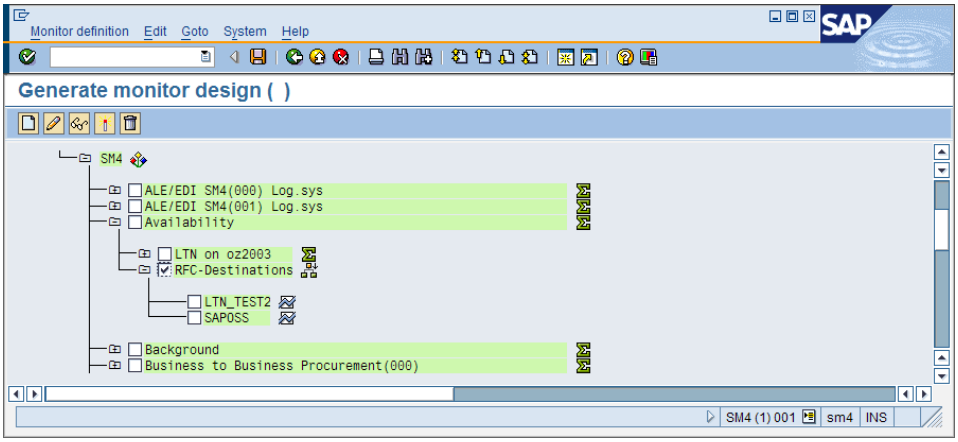
   c) Release Tab

Field	Setting
Execute method as	Data Collection Method

5. Start the monitoring of the RFC destination by re-starting the central server (the application server that offers the enqueue service) or by re-setting the monitoring segment of the central server to Warmup status.

   You can reset the Warmup status by using the Technical Topology of the Monitoring Architecture. In Transaction RZ21, choose Technical Infrastructure → Display Topology. Then choose Local Segments, enter change mode, mark the segment of the central server and choose Reset segment to Warmup status.

The RFC destination availability MTEs are automatically added to the standard availability monitor in the SAP CCMS Monitor Templates monitor collection. You will find them under the monitoring object RFC-Destinations:



Appendix E

Creating Custom Rules and Monitors

SAP CCMS supplies thousands of performance counters, some of them such as transaction specific SLAs are configured manually. The Management Pack bundles Monitors and Data Warehouse publishing rules for a number of the most commonly used counters however in all probability there are counters, that a specific customer needs to monitor and report, but are not supported out-of-the-box.

To address this situation we supply a Custom Management Pack template that extends OZSoft SAP management Pack. The file ***ozsoft.sap.custom.xml*** can be found in the installation folder (typically C:\Program Files\OZSoft Consulting Corporation\SAP Management Pack) in the ***scom*** sub-folder.

This is an unsealed management pack that extends SAP Management Pack. It includes template definitions for UnitMonitor and a DW Publishing Rule:

```
<Monitoring>
   <Rules>
      <Rule
            ID="ozsoft.sap.custom.Rule.WritePerformanceDataToDW.AppServer.XXX.YYY"
            Enabled="true"
            Target="OZ!ozsoft.sap.AppServer"
            ConfirmDelivery="false"
            Remotable="true"
            Priority="Normal"
            DiscardLevel="100">
         <Category>PerformanceCollection</Category>
         <DataSources>
            <DataSource
                  ID="DataSource"
                  TypeID="OZ!ozsoft.sap.TargetEntityPerformanceCounterDataProvider">
               <ObjectName>XXX</ObjectName>
               <CounterName>YYY</CounterName>
            </DataSource>
         </DataSources>
         <WriteActions>
            <WriteAction
                  ID="WriteToDW"
                  TypeID="SCDW!Microsoft.SystemCenter.DataWarehouse.PublishPerformanceData"/>
         </WriteActions>
      </Rule>
      </Rules>
      <Monitors>
         <!-- 2 state - Single Threshold Unit Monitor -->
         <UnitMonitor
               ID="ozsoft.sap.custom.Monitor.AppServer.XXX.YYY"
               Accessibility="Public"
               Enabled="true"
               Target="OZ!ozsoft.sap.AppServer"
               ParentMonitorID="Health!System.Health.PerformanceState"
               Remotable="true"
               Priority="Normal"
               TypeID="OZ!ozsoft.sap.CCMSMetricMonitorType"
               ConfirmDelivery="false">
            <Category>Operations</Category>
            <OperationalStates>
               <OperationalState
                  ID="UnderThreshold"
                  MonitorTypeStateID="SDKMetricUnderThreshold"
                  HealthState="Success" />
               <OperationalState
                  ID="OverThreshold"
                  MonitorTypeStateID="SDKMetricOverThreshold"
                  HealthState="Error" />
            </OperationalStates>
```

```
            <Configuration>
               <ObjectName>XXX</ObjectName>
               <CounterName>YYY</CounterName>
               <Frequency>60</Frequency>
               <Threshold>1000</Threshold>
            </Configuration>
         </UnitMonitor>
         <!-- 3 state - Error/Warning Thresholds Unit Monitor-->
         <UnitMonitor
               ID="ozsoft.sap.custom.Monitor.AppServer.AAA.BBB"
               Accessibility="Public"
               Enabled="true"
               Target="OZ!ozsoft.sap.AppServer"
               ParentMonitorID="Health!System.Health.PerformanceState"
               Remotable="true"
               Priority="Normal"
               TypeID="OZ!ozsoft.sap. CCMSMetricMonitorType2 "
               ConfirmDelivery="false">
            <Category>Operations</Category>
            <OperationalStates>
               <OperationalState
                  ID="UnderLow"
                  MonitorTypeStateID="SDKMetricUnderLowThreshold"
                  HealthState="Success" />
               <OperationalState
                  ID="UnderHighOverLow"
                  MonitorTypeStateID="SDKMetricUnderHighOverLowThreshold"
                  HealthState="Warning" />
               <OperationalState
                  ID="OverHigh"
                  MonitorTypeStateID="SDKMetricOverHighThreshold"
                  HealthState="Error" />
            </OperationalStates>
            <Configuration>
               <ObjectName>AAA</ObjectName>
               <CounterName>BBB</CounterName>
               <Frequency>60</Frequency>
               <HighThreshold>3</HighThreshold>
               <LowThreshold>2</LowThreshold>
            </Configuration>
         </UnitMonitor>
      </Monitors>
   </Monitoring>
```

Feel free to rename the custom management pack, change version, add more references and change rules and monitors IDs.

For the Rule/Monitor templates - replace **XXX** and **YYY** / **AAA** and **BBB** with the desired ***Object*** and ***Counter*** as it appears in the Figure 41. SAP System Performance View. In case if you need to target objects other than App Server, change the ***Target*** attribute accordingly.

For the Operational States Under/Between/Over– change ***HealthState*** attribute to Error/Success/Warning depending on the desired behavior

Replicate the Monitor/Rule as needed for all desired Performance Counters.