How-to guide: OS Command Adapter

This guide explains how you can react to MAI Alerts in SAP Solution Manager 7.10 by sending an OS Command

Version 2.20 (March 2015)
SAP Active Global Support
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E2E Monitoring and Alerting Infrastructure (E2E MAI):

E2E MAI is a unique and centralized alerting approach retrieving metrics and simple events from different data providers as CCMS at managed system or Wily Introscope via push or pull mechanism. It includes:

- An Event Calculation Engine to calculate complex events and end-user alerts out of the retrieved metrics and simple events to avoid alert flooding.
- A centralized directory for metrics, events and alerts including SAP and customer template knowledge and context information as system landscape, business process or interface information.

Then end-user alerts are forwarded to several alert consumers as Alert Inbox, Incident Management and Notification Engine provided by SAP Solution Manager. In order to forward those events to third party tool an Alert Consumer Connector allows implementing standard forwarding protocols.

In this context, an adapter is implemented to react to alert by calling an OS Command.
1 PREREQUISITES

1.1 SAP Solution Manager 7.10

The OS Command Adapter is available standard with Solution Manager 7.10 SP06 and upper releases.

1.2 SAP Notes

Some additional corrections need to be applied:

For SP06:
- https://service.sap.com/sap/support/notes/1752573
- https://service.sap.com/sap/support/notes/1754559
- https://service.sap.com/sap/support/notes/1754295
- https://service.sap.com/sap/support/notes/1779366

For SP07:
- https://service.sap.com/sap/support/notes/1779140
- https://service.sap.com/sap/support/notes/1820724
- https://service.sap.com/sap/support/notes/1779366

For SP08:
- https://service.sap.com/sap/support/notes/1959978
- https://service.sap.com/sap/support/notes/1820727

For SP10:
- https://service.sap.com/sap/support/notes/1965064

For SP11:
- https://service.sap.com/sap/support/notes/2009733

For SP12:
- https://service.sap.com/sap/support/notes/2134843

For SP13:
- https://service.sap.com/sap/support/notes/2134848

1.3 System Monitoring Setup

The System Monitoring setup (transaction solman_setup) must have been successfully completed.
2 OS COMMAND ADAPTER

The OS Command Adapter is fully configurable to execute any External OS Command.

2.1 Overall mechanism

1. The ACC is configured to send 3rd Party Alert Information to the BAdI Implementation (→ see configuration details).

2. All the necessary data to be forwarded to the 3rd party is bundled in a table and passed to the OS Command Adapter.
   a. Instantiate the OS Command Adapter and pass the AlertInfo Bundle (key-value table)
   b. Call : OSCommandAdapter→execute_command()
   c. This will trigger the steps 3 and 4.

3. Based on the OS Command Configuration, the Executable options and parameters are built (→ see configuration details).

4. The configured OS Command is called.
### 2.2 OS Command usage

Starting with Solution Manager 7.10 SP06 an SAP-Standard BAdI implementing class is provided: 

**CL_ALERT.REACT.OS_COMMAND** (package AL_SOLMAN_ALRT_AL_REACTION_IMP)

The provided implementation is bundling the following MAI Alert Information:

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Type</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>[MAI:ALERT:MO_NAME]</td>
<td>Name of the ManagedObject reporting the Alert</td>
<td>Char</td>
<td>128</td>
</tr>
<tr>
<td>[MAI:ALERT:MO_TYPE]</td>
<td>T_SYSTEM, INSTANCE, HOST, DBMS…</td>
<td>Char</td>
<td>10</td>
</tr>
<tr>
<td>[MAI:ALERT:ID]</td>
<td>Unique ID that identifies the Alert in MAI</td>
<td>Char</td>
<td>32</td>
</tr>
<tr>
<td>[MAI:ALERT:DATE]</td>
<td>UTC Date (YYYYMMDD)</td>
<td>Char</td>
<td>8</td>
</tr>
<tr>
<td>[MAI:ALERT:TIME]</td>
<td>UTC Time (hhmmss)</td>
<td>Char</td>
<td>6</td>
</tr>
<tr>
<td>[MAI:ALERT:NAME]</td>
<td>Human readable short name of the Alert</td>
<td>Char</td>
<td>128</td>
</tr>
<tr>
<td>[MAI:ALERT:TECHNICAL_NAME]</td>
<td>Technical ID of the Alert</td>
<td>Char</td>
<td>128</td>
</tr>
<tr>
<td>[MAI:ALERT:DESCRIPTION]</td>
<td>Alert Description (or Custom Description)</td>
<td>Char</td>
<td>128</td>
</tr>
<tr>
<td>[MAI:ALERT:CATEGORY]</td>
<td>AVAIL, PERFORM, EXCEPTION, CONFIGURE</td>
<td>Char</td>
<td>10</td>
</tr>
<tr>
<td>[MAI:ALERT:RATING]</td>
<td>0: Unknown, 1: Normal, 2: Warning, 3: Critical</td>
<td>Integer</td>
<td>1</td>
</tr>
<tr>
<td>[MAI:ALERT:SEVERITY]</td>
<td>0: Low … 5: Medium … 9: Critical</td>
<td>Integer</td>
<td>1</td>
</tr>
<tr>
<td>[MAI:METRIC:NAME_PATH]</td>
<td>Metric Name (or Metric Path for grouped metric)</td>
<td>Char</td>
<td>128</td>
</tr>
<tr>
<td>[MAI:METRIC:VALUE]</td>
<td>Metric Value and Unit (or Metric TextValue)</td>
<td>Char</td>
<td>128</td>
</tr>
<tr>
<td>[MAI:ALERT:MO_ID]</td>
<td>Unique ID that identifies the ManagedObject</td>
<td>Char</td>
<td>32</td>
</tr>
<tr>
<td>[MAI:ALERT:STATUS]</td>
<td>0: Open, 1: In process, T: Transferred, C: Confirmed…</td>
<td>Char</td>
<td>4</td>
</tr>
<tr>
<td>[MAI:ALERT:REASON_FOR_CLOSURE]</td>
<td>1: Re-configuration, 2: Work mode change, 3: Green alert…</td>
<td>Integer</td>
<td>1</td>
</tr>
<tr>
<td>[MAI:ALERT:PRIORITY]</td>
<td>1: Low, 2: Medium, 3: High, 4: Very high</td>
<td>Integer</td>
<td>1</td>
</tr>
</tbody>
</table>
Here are the corresponding Value Ranges:

<table>
<thead>
<tr>
<th>[MAI:ALERT:MO_TYPE]</th>
<th>[MAI:ALERT:CATEGORY]</th>
<th>[MAI:ALERT:STATUS]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fix.Val.</strong></td>
<td><strong>Short Descrp.</strong></td>
<td><strong>Fix.Val.</strong></td>
</tr>
<tr>
<td>CONNECTION</td>
<td>Connection</td>
<td>0</td>
</tr>
<tr>
<td>DBMS</td>
<td>Database</td>
<td>1</td>
</tr>
<tr>
<td>DB_SCHEMA</td>
<td>Test MOT (for all Testing)</td>
<td>2</td>
</tr>
<tr>
<td>HOST</td>
<td>Host (Server)</td>
<td>3</td>
</tr>
<tr>
<td>INSTANCE</td>
<td>Technical Instance</td>
<td>4</td>
</tr>
<tr>
<td>PI_DOMAIN</td>
<td>Process Integration (PI/PI) Domain</td>
<td>5</td>
</tr>
<tr>
<td>SCENARIO</td>
<td>Generic Managed Object Type</td>
<td></td>
</tr>
<tr>
<td>SCR</td>
<td>Script</td>
<td></td>
</tr>
<tr>
<td>SCR_RPG</td>
<td>Script on Robot</td>
<td></td>
</tr>
<tr>
<td>SCR_STEP_RPG</td>
<td>Script Step on Robot</td>
<td></td>
</tr>
<tr>
<td>TECH_COMM</td>
<td>Technical Component</td>
<td></td>
</tr>
<tr>
<td>T_SYSTEM</td>
<td>Technical System</td>
<td></td>
</tr>
<tr>
<td>RB</td>
<td>Robot</td>
<td></td>
</tr>
<tr>
<td>NR_DEVICE</td>
<td>Active Network Device</td>
<td></td>
</tr>
<tr>
<td>DAY</td>
<td>Day of Week</td>
<td></td>
</tr>
<tr>
<td>ORM</td>
<td>ORM</td>
<td></td>
</tr>
<tr>
<td>STORAGE</td>
<td>Storage System</td>
<td></td>
</tr>
<tr>
<td>UNSPECIFIED</td>
<td>Unspecified Managed Object</td>
<td></td>
</tr>
<tr>
<td>MOBILE</td>
<td>Mobile Device</td>
<td></td>
</tr>
<tr>
<td>IP_CHANNEL</td>
<td>Interface Channel</td>
<td></td>
</tr>
<tr>
<td>BP_MOM_OBJ</td>
<td>Business Process Monitoring Object</td>
<td></td>
</tr>
<tr>
<td>JOB</td>
<td>Job</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>[MAI:ALERT:RATING]</th>
<th>[MAI:ALERT:REASON_FOR_CLOSURE]</th>
<th>[MAI:ALERT:PRIORITY]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fix.Val.</strong></td>
<td><strong>Short Descrp.</strong></td>
<td><strong>Fix.Val.</strong></td>
</tr>
<tr>
<td>0</td>
<td>Grey</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>Green</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Yellow</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Red</td>
<td>3</td>
</tr>
</tbody>
</table>
2.3 BAdI Implementation

The OS Command Adapter is ready to be used within a BAdI implementation that has to be created.

2.3.1 Custom BAdI implementation overview

Any listener of the Alert Inbox must implement the BAdI Definition `BADI_ALERT_REACTION` from the Enhancement Spot `ALERT_REACTION` (package `AI_SOLMAN_ALRT_AL_REACTION_ENH`):

![Enhancement Spot](image)

BAdI filter is:

- `ALERT_REACTION_OPTION` (Character-Type)

The Implementing Class must be `CL_ALERT.REACT.OS_Command` if you want to use the SAP-Standard MAI Information, or any other implementing class according to your needs.
2.3.2 **Steps to create the BAdI entities**

a) With transaction se19, create a new Enhancement Implementation, e.g. "Z_ALERT_REACTION_IMPL" based on the existing Enhancement Spot ALERT_REACTION:
Here is the detailed view of the newly created BAdI Implementation:
Then set a dedicated BAdI Filter Value that will be used to differentiate Configurations.

After activating the implementing class and the BAdI implementation, it will be registered when the next Alert Notification is triggered by the ACC.
3 OS COMMAND CONFIGURATION
As of Solution Manager SP07, a dedicated User Interface has been implemented to configure the OS Command.

⚠ SP06 releases do not have a dedicated User Interface and configuration is done via the Administrative SolutionManager Generic Storage UI with Configuration ID = MAI_OS_CMS_CONFIG. (→ see configuration details).

⚠ For SP07 and upper, make sure in transaction SICF that the service “mai_os_command_config” is active.

3.1 User Interface SP07 and upper

http://<SolutionManagerHost>:<port>/sap/bc/webdynpro/sap/mai_os_command_config
If this is the first time you are accessing the Configuration UI, you’ll need to create a new Configuration.

1. Expand the Panel “Create a Configuration”
2. Set Filter Value to “<BAdI_FilterValue>_REACT” (replace <BAdI_FilterValue> by its value configured when creating the BAdI entities)
3. Press “Create”
4. Set Filter Value to “<BAdI_FilterValue>_REACT_CLOSE” (replace <BAdI_FilterValue> by its value configured when creating the BAdI entities)
5. Press “Create”

This will create 2 Configuration Entries for each type of forwarding (AlertChange & AlertClosure):
- one describing the OS Command Options,
- one describing the OS Command Parameters.

⚠️ It is mandatory to create those 2 configurations to react differently:
- Reacting on Alert Change → Configuration <BAdI_FilterValue>_REACT
- Reacting on Alert Closure → Configuration <BAdI_FilterValue>_REACT_CLOSE
3.1.1 OS Command Options

The 2 mandatory options are already pre-filled:

00;COMMAND_NAME
01;OP_SYSTEM

The values must reflect the SM49 External OS Command Configuration.

The 2 mandatory configurations are aimed to eventually react differently between an Alert Change (OS_CMD_REACT) and an Alert Closure (OS_CMD_REACT_CLOSE). It is however possible to deactivate one of them by setting the value "<SKIP>" to the COMMAND_NAME option.
You can specifically skip some ratings by adding the Parameter Name "00;RATINGS_TO_SKIP" and set the values of the ratings you want to skip, separated by the separator ";". For example, to skip Grey and Green Alert Ratings, the value has to contain : "0;1"

Do not forget to prefix (separated by semi-columns) the option name with the index order to which you want the OS Command to be called:

01;option1 / value1
02;option2 / value2 ...

Option values can remain empty.

You can freely add new options. For example:

00;COMMAND_NAME SM49_CMD
01;OP_SYSTEM ANYOS
02; -v
03; -d 'true'
04; -DIR /cfg/mydir/

Will create the following OS Command call:

<SM49_CMD_ConfiguredCommand> -v -d 'true' -DIR /cfg/mydir/>
3.1.2 OS Command Parameters

Additionally to Options, you can configure the OS Command Adapter to send Parameters.

By default it is configured with "-1;NO_PARAMETER" that indicates that no parameter will be build. Please do not remove this entry to avoid the Configuration Entry to be deleted automatically.

If you need to add Parameters, replace the "-1;NO_PARAMETER" with the Parameters at your convenience, for example:

01:alertID [MAI:ALERT:ID]
02:alertDateTime [MAI:ALERT:DATE] at [MAI:ALERT:TIME]
03:description [MAI:ALERT:DESCRIPTION]
04:$$ [MAI:ALERT:RATING]

This will create the following Parameters’ line that will be concatenated to the previously build Options’ line:

alertID <MAI_alertID_value> alertDateTime ‘<MAI_alertDateTime_value> at <MAI_alertTime_value>’ description ‘<MAI_alertDescription_value>’<MAI_alertRating_value>

⚠️ The Parameter name ‘$$’ indicates that there will be parameter name (only a parameter value).

⚠️ The OS Command is limiting the concatenated length of all Parameters to maximum 1024 chars.
3.2 User Interface SP06

The OS Command dedicated User interface could not be downported to SP06. Therefore you’ll need to use the Administrative Solution Manager Storage UI:

http://<SolutionManagerHost>:<port>/sap/bc/webdynpro/sap/wd_sise_admin

If this is the first time you are accessing the Configuration UI, you’ll need to create a new Configuration to create the entry MAI_OS_CMD_CONFIG~MAI_OS_CMD_CONFIG.

Run ABAP Report: PR_ALERT_INIT_OS_CMD_CONFIG.
Set Filter Value to the previously assigned BAdI Filter Value concatenated with:
1. “_REACT” for the REACT_TO_ALERTS OS Command
2. “_REACT_CLOSE” for the REACT_TO_CLOSED_ALERT OS Command

This will create 2 Configuration entries: one relative to the OS Command Options, the other relative to the OS Command Parameters. The configuration is then identical to the previous section.
4 MAI CONFIGURATION TO REACT TO ALERTS

You need to enable the 3rd Party forwarding and this can be done at different levels:
- Global
- and/or Template
- and/or Alert.

4.1 Enabling the Third-Party Component at Global Level

Call transaction solman_setup
Select Technical Monitoring > System Monitoring
Select Step 2: Configure Infrastructure > Step 2.4: Default Settings
Select Third-Party Components tab
Add Entry: <OS Command BAdI Description> with scope = All Alerts
Check Third-Party Components
Save
Jump to Step 5: Define Scope
Select the Managed Object to configure
Jump to Step 6: Setup Monitoring
Eventually assign the template and always press Apply and Activate
4.2 Enabling the Third-Party Component at Template Level

Call transaction solman_setup
Select Technical Monitoring > System Monitoring
Select Step 4: Template Maintenance
Select the Template and switch to Expert Mode
Select the Tab Third-Party Components
Set Dropdown to active and add Entry: <OS Command BAdI Description> with scope = All Alerts
Save
Jump to Step 5: Define Scope
Select the Managed Object to configure
Jump to Step 6: Setup Monitoring
Eventually assign the template and always press Apply and Activate

4.3 Enabling the Third-Party Component at Alert Level

Call transaction solman_setup
Select Technical Monitoring > System Monitoring
Select Step 4: Template Maintenance
Select the Template and switch to Expert Mode
Select the Tab Alerts
Select the specific alert you want to configure and go to the Tab Third-Party Components
Set Dropdown to active and add Entry: <OS Command BAdI Description> with scope = All Alerts
Save
Jump to Step 5: Define Scope
Select the Managed Object to configure
Jump to Step 6: Setup Monitoring
Eventually assign the template and always press Apply and Activate
5 TROUBLESHOOTING

Logs are available using the standard SLG1 transaction:

External ID has the following structure:

<ConfigurationFilterValue> _ OSCMD_<ManagedObject Name> _ <Alert Category> _ <AlertName>

For the Initialization process and if an unexpected error occurs, you can also check the following ExternalID: