How-To Guide
SAP Solution Manager
Document Version: 1.0 – 2017-05-31

Configuring Job Monitoring in SAP Solution Manager 7.2
## Typographic Conventions

<table>
<thead>
<tr>
<th>Type Style</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Example</strong></td>
<td>Words or characters quoted from the screen. These include field names, screen titles, pushbuttons labels, menu names, menu paths, and menu options. Textual cross-references to other documents.</td>
</tr>
<tr>
<td><strong>Example</strong></td>
<td>Emphasized words or expressions.</td>
</tr>
<tr>
<td><strong>EXAMPLE</strong></td>
<td>Technical names of system objects. These include report names, program names, transaction codes, table names, and key concepts of a programming language when they are surrounded by body text, for example, SELECT and INCLUDE.</td>
</tr>
<tr>
<td><strong>Example</strong></td>
<td>Output on the screen. This includes file and directory names and their paths, messages, names of variables and parameters, source text, and names of installation, upgrade and database tools.</td>
</tr>
<tr>
<td><strong>Example</strong></td>
<td>Exact user entry. These are words or characters that you enter in the system exactly as they appear in the documentation.</td>
</tr>
<tr>
<td><strong>&lt;Example&gt;</strong></td>
<td>Variable user entry. Angle brackets indicate that you replace these words and characters with appropriate entries to make entries in the system.</td>
</tr>
<tr>
<td><strong>EXAMPLE</strong></td>
<td>Keys on the keyboard, for example, <strong>F2</strong> or <strong>ENTER</strong>.</td>
</tr>
</tbody>
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## Document History

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Change</th>
</tr>
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<tr>
<td>1.0</td>
<td>2017-05-31</td>
<td>Initial version</td>
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1 Introduction

SAP Solution Manager 7.2 provides centralized job monitoring for your end-to-end monitoring and alerting infrastructure. As a detailed reference based on the job monitoring screens of SAP Solution Manager 7.2, this guide helps you to create, configure, and maintain monitoring objects. It explains the many data collection and alert generation options. Here you will find a more comprehensive and descriptive approach than within the UI’s embedded help material, enabling you to increase efficiency through precise monitoring and alerting behavior.

1.1 New Features in SAP Solution Manager 7.2

- The creation and configuration screen for job monitoring has been revised to improve user experience.
- SAP Solution Manager scheduling enabler (SMSE) job type can monitor jobs scheduled by an external scheduler.
- A mass maintenance functionality allows for the configuring of monitoring objects. Export and import functions via Microsoft Excel allow you to create and adjust monitoring objects offline.
- With support package 5, it is possible to add custom job types, and you can therefore monitor jobs which cannot be monitored by the standard job types. All custom job types use the job monitoring framework (configuration UI, monitoring and alerting infrastructure, and data collection framework).
2 Job Monitoring Data Collector Basics

2.1 General

The job monitoring data collector continually looks for changes of all background jobs since the last data collection. This differs from other data collectors, such as those belonging to system monitoring and business process monitoring, which collect static data specifically at the time the request is initiated.

The data collector stores information in database tables. The timestamp of the last successful data collection is stored per monitoring object at the end of data collector processing. This timestamp ensures that metrics continue to be collected for the correct time interval, even if the last data collection failed.

The configuration of a monitoring object (identification criteria, schedule, and metric configuration) is stored in the data collector as well. This information is written to the data collector when the monitoring object is activated.

2.2 Prerequisites

2.2.1 RFC Connections

Remote function calls (RFC) are used the creation of monitoring objects and for data collection data. As a prerequisite for job monitoring, RFC connections must be set up. This can be done automatically within the managed system configuration.

The following standard RFC connection types are used for job monitoring:

- RFC Read Access (usually SM_<SID>CLNT<client>_READ, e.g. SM_PRDCLNT200_READ)
- RFC for Change Manager (usually SM_<SID>CLNT<client>_TMW, e.g. SM_PRDCLNT200_TMW)

1 Note

Only if the main product version of the technical system is set as diagnostics-relevant in the Landscape Management Database, job monitoring will be able to determine a RFC destination.

1 Note

To avoid authorization issues, keep managed systems’ user roles for RFC connections up-to-date. For step-by-step instructions on how to do this, reference SAP Note 2257213.

2.2.2 SMSE Interface to External Scheduler

For the data collection via PUSH mode (monitoring objects for ABAP jobs, SAP Business Objects platform jobs and SAP Data Services jobs which had been created using the option "Add jobs - From external scheduler") the
SMSE interface to an external scheduler must be set up. This can be done in the work center SAP Solution Manager: Configuration → Job Management → Step 5, Integrate with SMSE.

### 2.2.3 Mass Maintenance

The UI of mass maintenance uses an imbedded Excel application that works in Internet Explorer. This UI is provided by the Office Integration in Web Dynpro for ABAP. Refer to SAP Note 766191 - Installation of Active Component Framework for prerequisites.

### 2.2.4 Special Prerequisite for SMSE Jobs

Please refer to section 5.1.9 for details about the special prerequisite for SMSE jobs.

### 2.2.5 Prerequisites for Custom Job Types

The monitoring of custom job types requires configuration and a BAdI implementation to access job data. Please refer to section 7.3 for details.

### 2.3 Data Collection Logic

When the data collector is called, it looks for jobs which are scheduled or have been started in a defined time interval. This time interval is defined by the last successful data collection and the moment the data collector request was initiated.

If a job matches the identification criteria of a monitoring object, a job instance for this monitoring object is generated. If a job instance does not have a final state of completed or canceled, a separate database table stores the information for later review. The "remembered" job instance is checked again in the next data collection.

Job instances require a schedule entry assignment. Job instances without schedule assignment are not processed by the metric calculation. Note that start procedures "use job start condition" and "use chain start condition" automatically generate a new schedule entry together with an assignment for each new job instance. Accordingly the metric calculation is performed for all job instances if these start procedures are configured.

The following flowchart shows how the data collection works and how it can be adjusted by configuration settings.
2.4 Data Collection Modes

There are two data collection modes. The difference is how job data are retrieved and updated:

- **PULL mode**
  In this mode, the data collector pulls the information of new and updated jobs from the managed system. For this, the data collector uses selections from database tables (ABAP jobs and SAP Business Warehouse [BW] process chains), Web Services, or RFC calls. PULL mode can be used for jobs created within the managed system or created externally by an external scheduler.

- **PUSH mode**
  PUSH mode can be used for jobs that are created in an external scheduler certified for the SMSE interface. While called PUSH mode, this mode technically consists of both a push and a pull activity.
After creating a monitoring object for PUSH mode, the corresponding job group in the external scheduler links to the monitoring object’s job documentation. Also, a PUSH flag is set for the job group. As a result, whenever a job in the flagged job group is created or changed, the external scheduler pushes data to SAP Solution Manager, and writes the data to a buffer table.

Once the data collector is initiated, it pulls new job data from the buffer table for further processing, comparable to the PULL mode process.

Note that PULL and PUSH modes cannot be selected specifically. The way how a monitoring object is configured determines the mode. Refer to the table below for detailed information on collection mode determination.

### 2.5 Location of Data Collector

Job monitoring’s data collector coding is delivered as part of software component ST-PI. Depending on the job type and the data collection mode, the data collector is initiated either in the managed system or in SAP Solution Manager.

The following table provides an overview in which system the data collector is initiated.

<table>
<thead>
<tr>
<th>Job Type</th>
<th>Add Jobs</th>
<th>Collection Mode</th>
<th>Location of Data Collector</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABAP job</td>
<td>From managed system</td>
<td>PULL</td>
<td>Managed System</td>
</tr>
<tr>
<td>ABAP job</td>
<td>Directly</td>
<td>PULL</td>
<td>Managed System</td>
</tr>
<tr>
<td>ABAP job</td>
<td>From external scheduler</td>
<td>PUSH</td>
<td>SAP Solution Manager</td>
</tr>
<tr>
<td>BW Process Chain</td>
<td>From managed system</td>
<td>PULL</td>
<td>Managed System</td>
</tr>
<tr>
<td>BW Process Chain</td>
<td>From external scheduler</td>
<td>PULL</td>
<td>Managed System</td>
</tr>
<tr>
<td>Business Objects</td>
<td>From managed system</td>
<td>PULL</td>
<td>SAP Solution Manager</td>
</tr>
<tr>
<td>Platform job</td>
<td>From external scheduler</td>
<td>PUSH</td>
<td>SAP Solution Manager</td>
</tr>
<tr>
<td>Data Services job</td>
<td>From managed system</td>
<td>PULL</td>
<td>SAP Solution Manager</td>
</tr>
<tr>
<td>Data Services job</td>
<td>From external scheduler</td>
<td>PUSH</td>
<td>SAP Solution Manager</td>
</tr>
<tr>
<td>SMSE job</td>
<td>From external scheduler</td>
<td>PULL</td>
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</tr>
<tr>
<td>SMSE job</td>
<td>Directly</td>
<td>PULL</td>
<td>SAP Solution Manager</td>
</tr>
<tr>
<td>Custom job type</td>
<td>Directly</td>
<td>PULL</td>
<td>SAP Solution Manager</td>
</tr>
<tr>
<td>Custom job type</td>
<td>From managed system</td>
<td>PULL</td>
<td>SAP Solution Manager</td>
</tr>
</tbody>
</table>
3 Creating a New Monitoring Object or Assigning an Existing Monitoring Object to a Different Context

There are three ways to create monitoring objects for job monitoring:

- Business process monitoring setup
- Job documentation
- Technical monitoring: SAP Solution Manager Configuration → Application Operations → Job Monitoring

This chapter explains the options to create a monitoring object. The option "Get Job Identification – From Managed System" provides the possibility to assign an existing monitoring object to a new context, such as a technical scenario.

3.1 Monitoring Object Overview

The new configuration UI provides an overview of all monitoring objects assigned to the technical scenario, independent from the job type and system. The table can be sorted and filtered.

The table's menu options enable you to create and manage monitoring objects:

- New: Creates a new monitoring object. This selection brings up a separate screen and a guided procedure. Once completed, the identification criteria and the schedule are defined and the monitoring object is saved. The alert configuration is then conducted in the main UI.
- Mass Generate & Activate: Generate and activate the selected monitoring objects, either in the foreground or in the background.
- Mass Deactivate: Deactivate the selected monitoring objects, either in the foreground or in the background.
- Actions: This selection provides several options for changing an individual monitoring object. Options include generate, activate, deactivate, and delete.
- Refresh: Updates the overview list. It is intended to be used after background activation or deactivation.
3.2 Create a Monitoring Object

The screenshot below shows the creation screen for a monitoring object.

To create a monitoring object, follow this procedure:

- Select a job type from the dropdown list. The value help provides all standard job types and custom job types when configuring in technical monitoring or business process monitoring. The value help is restricted when opening the configuration from a job documentation.

- Select the technical system in which the job is executed. The value help provides systems that are assigned to the technical scenario and support the selected job type. For ABAP jobs and BW process chains, systems with RFC connection of type TMW are offered only.

- ABAP jobs and SMSE jobs contain a "Client" field. In the case of an SMSE job, this field is visible if the selected system has an ABAP stack.

  **Note**
  
  For ABAP jobs, systems and clients can be selected if a RFC destination of type TMW exists. For BW process chains, systems can be selected if there is a RFC destination of type TMW for the productive client.

- The Copy Existing Monitoring Object field allows an existing monitoring object to serve as a template for setting alert configuration, data collection settings (such as frequency and time zone), alert validity settings, and notification and incident settings. Identification criteria and schedule are not copied with this activity since they are job-specific.
- Get Job Identification defines the maintenance of identification criteria, and determines the PULL or PUSH collection mode:
  1. Directly
  2. From Managed System
  3. From External Scheduler

For more information on PULL or PUSH modes, reference the Data Collection Modes chapter.

3.2.1 Get Job Identification – Directly

This option, Get Job Identification – Directly, allows you to manually maintain the identification criteria. Therefore, the guided procedure’s select jobs step is ignored. This option is useful if the jobs’ identification criteria are known already, or if the jobs should be identified using wildcards, such as job name = "FIN_*."

Manually set the identification criteria and the schedule, and confirm the selection.
3.2.2 Get Job Identification – From Managed System

Get Job Identification – From Managed System is the recommended way to create the identification and expected schedule for a monitoring object. Selecting this option prompts fields for the second step, Select Jobs.

This Select Jobs screenshot sample shows available ABAP jobs in the lower section. The middle section contains time parameter settings for a job selection. By default, the job search will return only one job instance with the same job name. Choosing the middle section’s option to show all job instances, you receive the maximum results for job instances matching the selection criteria.

The upper section of the screen displays the selection criteria.

There are two possibilities to generate the job identification criteria for the monitoring object from this step:
- **Selected Job**: Under this first option, the system checks if there is an existing monitoring object for the job instance in the results list. Upon detecting a monitoring object was found, the Selected Job step prompts the user to decide if a new monitoring object should be created or if the existing monitoring object should be used.
Choosing to create a new monitored object transfers all job parameters (such as job name, job step number, ABAP program, variant, and user) to the new monitoring object. The scheduled start time and period of the selected job instance transfers to appear as the planned start time and periodicity of the new monitoring object.

Choosing to use existing monitored object assigns the existing monitoring object to the technical scenario, and user can navigate to step 3, Maintain Monitoring Objects.

Note
Currently, the "use existing monitored object" option is the only way to assign an existing monitoring object to a different context in technical monitoring. This option is not shown in business process monitoring. Business process monitoring offers an option to assign an existing monitoring object to the new context.

Note
The value help uses the READ RFC destination to the managed system for ABAP jobs and BW process chains. If no jobs are returned, check the RFC destination and update the user's roles for the READ destination in the managed system, according to SAP Note 2257213.

- Take Over Filter Criteria: This second option transfers the job filter criteria as identification criteria of the monitoring object. The job search can be used to verify which jobs will be returned by the criteria. It is not required to select a job instance.
  This option will not provide any schedule information for the monitoring object.

In step 3, Maintain Monitoring Objects, the identification criteria and the schedule can be checked before the monitoring object is saved.
The identification tab, as shown below, displays identification criteria, language settings, and the alert severity.

![Identification Tab Image](image)

**Note**

A monitoring object’s identification criteria, copied from a job instance provide very specific criteria. The job name and all parameters of the specified job step are transferred. If there is any change in the job step (such as an added step or a changed variant), the job will not be processed by the data collector further. To avoid this, consider less specific identification criteria. For example, if the job name is sufficient to identify the job, it is not necessary to provide ABAP program name, variant and user of a job step.
On the schedule tab, manage the job start condition, the schedule data, and the alert validity settings.

Once finished, confirm your selections to create and save the monitoring object.

3.2.3 Get Job Identification – From External Scheduler

For ABAP, SAP Business Objects Enterprise Platform, and SAP Data Services jobs, this is the way to create a monitoring object using the PUSH mode for data collection. PUSH mode means that job data are pushed from an external scheduler to a buffer table in SAP Solution Manager each time the job status changes. The data collector for job monitoring reads the job data from the buffer table and generates the corresponding metrics. The metrics are sent to the monitoring and alerting infrastructure and processed there to generate alerts. This contrasts with PULL mode, where the data collector selects the job data directly from the managed system.

Note

SMSE jobs are collected in PULL mode only. Choosing the option to add jobs - from external scheduler creates a monitoring object for PULL mode.

Note

The external scheduler needs to have implemented the SMSE interface. This is the case for SAP Business Process Automation by Redwood, its predecessor SAP Central Process Scheduling by Redwood, and other schedulers. Please reference http://global.sap.com/community/ebook/2013_09_adpd/enEN/search.html#search=SM-SE for certified partner products.

Maintain the selection criteria as follows:

- Select the SMSE (RFC) destination of the external scheduler.
• Select the isolation group.
• Select the queue(s) for the job search.
• Define the time interval for the search.

After selecting the job definition, the corresponding job parameters from the external scheduler are shown. Some of these parameters can be used for the job selection in the external scheduler. For a job definition referring to an ABAP job the parameters SAP Job Name, ABAP Program, ABAP Variant and SAP User Name are available for the job selection.

Maintain the relevant parameters as selection criteria.
- Execute the job selection.
- Mark a job instance and select either Selected Job or Take Over Filter Criteria before navigating to the next step.
- Check the data on the identification and schedule tabs.
- Choose to confirm your selections to save the monitoring object.

Note
A job documentation is attached to a monitoring object saved for the first time. If an existing job documentation is not applicable for use, a new job documentation is generated in SAP Solution Manager. The job in the external scheduler is linked to this job documentation and the SMSE PUSH functionality is activated for this job. The link and PUSH activation are carried over to future jobs in the same job group. Each monitoring object under PUSH mode is linked to a dedicated job group in the external scheduler. It is not possible to monitor several jobs or job definitions with only one monitoring object under PUSH mode.

Note
For BW process chains "From External Scheduler" will create a monitoring object under PULL mode. The BW process chain ID is read from the external scheduler. For SMSE jobs, the job identification data is read using "Add - From External Scheduler". This identification data is later used when pulling job information from the external scheduler in the data collection.

3.2.4 Special Case: BW Process Chain

A BW process chain is a hierarchical object. It consists of one chain header and one or more chain steps or elements. To monitor a BW process chain, create a monitoring object for the BW process chain header, using the creation UI. The creation of a monitoring objects for chain elements is provided in the overview screen for monitoring objects. If a monitoring object of type BW process chain header is selected in the monitoring objects table, an object hierarchy table appears below it. Choose to add steps from the table menu to create monitoring objects for elements of the process chain.
4 Mass Maintenance

Mass maintenance provides the possibility to create new monitoring objects, or to change the properties of existing monitoring objects.

4.1 Start Mass Maintenance

Select one or several monitoring objects in the table. Ensure that the monitoring objects share the same job type.

Choose mass maintenance to open a new screen that shows the monitoring objects in an Excel screen.
4.2 Change Existing Monitoring Objects

To change an existing monitoring object in the Excel screen, navigate to the object’s row, and edit the available fields. To change a cell of an available field, double-click on it or select the cell and use the maintenance box at the top of the table.

4.3 Create New Monitoring Objects

New monitoring objects can be created by adding new rows in the spreadsheet. Either maintain the fields manually or copy the columns of an existing monitoring object and paste them in an empty row. To copy a monitoring object, select columns with a header text only.

1 Note

It is not possible to copy a complete row.
There are some hidden data which are required to uniquely identify existing monitoring objects. These data must not be copied.

Another convenient way to create monitoring objects is via the combination of export and import. This allows you to maintain the monitoring objects offline.

4.4 Export and Import

Choosing export in the Excel screen saves the content to an Excel file. The data in the Excel file can be modified. It is also possible to add new monitoring objects.

The import option lets you browse for an Excel file and upload it to the embedded Excel screen. At the end of the import process, the data undergoes validation. The import works properly if the uploaded file is derived from the Excel screen’s export functionality.

4.5 Validation

The data in mass maintenance are validated to avoid potential inconsistencies. Choose the validation option from the Excel screen. During import from an Excel file, and while saving mass maintenance, validation runs automatically.

If the validation identifies a problem, an error message appears, and affected fields are highlighted red.
4.6  Save

Saving in the Excel screen initiates a validation check for the data in mass maintenance. If there are no validation errors, existing monitoring objects are changed and new monitoring objects are created. Saving does not close the mass maintenance screen. It is possible to save changes intermittently during processing.

4.7  Close

The close option will close the mass maintenance screen. Be sure to save changes before closing.
5 Configuring a Monitoring Object

5.1 Identification Criteria

The data collector uses identification criteria to determine if a found job is relevant for a monitoring object. If a found job matches the identification criteria, a new job instance is generated for the monitoring object.

5.1.1 Start Procedure

The start procedure defines the job schedule in the data collector. Note: The data collector ignores all jobs not assigned to a schedule entry.

There are up to four start procedures available:

- **Use job (chain) start condition**
  
  With this start procedure, every job (chain) matching the identification criteria will generate a job instance and a corresponding schedule entry. The metric calculation is performed for each job instance. **This start procedure is optimal for almost all monitoring requirements.** It is highly recommended for high frequency jobs or if the monitoring is configured for a group of jobs.

  Special case for start delay metric:
  
  - Use job start condition can only monitor the technical delay of a job. The technical delay is the difference between start time and scheduled start time of a job. A severe technical delay can occur if, for example, there is no free background process or the job dispatcher is blocked.
  
  - If there is a requirement to monitor the start delay compared to a predefined schedule, use the by time start procedure, explained below.

- **By time**
  
  This start procedure uses the information in the configuration’s schedule area to generate an expected schedule for a monitoring object’s job instances. Only job instances matching this expected schedule are processed by the data collector.
  
  Planned Start Time and Period[Minutes] are used to generate the expected schedule for periodic jobs. **Note:** Values 0 and 1440 in field “Period [Minutes]” means that a job is expected once per day, earliest at the planned start time. The period may range from 0 to 1440 minutes.

- **By event**
  
  Use this start procedure in combination with event ID and event parameter criteria. **Note:** Event SAP_END_OF_JOB cannot be used for periodic jobs. In the event parameters, a dedicated job instance must be provided. Consider criteria use job start condition instead.

- **By preceding job**
  
  Use this start procedure in combination with preceding job criteria. **Note:** The by preceding job start procedure has the same effect as event SAP_END_OF_JOB. It cannot be used for periodic jobs because a dedicated job instance must be provided. Consider criteria use job start condition instead.
Caution

The wrong understanding of the start procedure and the schedule in the configuration of a monitoring object is one of the most common reasons why metrics and alerts are missing. The use of start procedure "Use job (chain) start condition" reduces the risk for missing alerts significantly.

Note

Do not use by time start procedure for high-frequency jobs, defined with a period less than or equal 10 minutes.

5.1.2 Job Rule

The job rule provides the ability to change the identification criteria dynamically during data collection. To use the job rule, create an implementation of BAdi definition /SOMO/UNIJOBMONRULE. Reference SAP Note 2224161 for job rule information.

5.1.3 Monitored Object Name

Maintained the monitoring object’s name in the identification criteria or in the table of monitoring objects.

Note

In SAP Solution Manager 7.2, monitoring object names must be unique for each system used.

5.1.4 Job Documentation

Saving a monitoring object generates or automatically assigns a job documentation. Display the assigned job documentation with the show job documentation link.

In PUSH mode, job documentation is linked to the job or group in the external scheduler. PUSH mode also activates SMSE PUSH status messaging. Reference section Get Job Identification – From External Scheduler for additional PUSH mode details.
5.1.5  ABAP Job

Only ABAP jobs have the benefit of defining identification criteria with the use of wildcards. This means that it is possible to define a monitoring object for a single job, for a group of jobs that follow a given naming convention, or for all jobs.

<table>
<thead>
<tr>
<th>Job Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job Name:</td>
</tr>
<tr>
<td>variant</td>
</tr>
<tr>
<td>User:</td>
</tr>
<tr>
<td>Event ID:</td>
</tr>
<tr>
<td>Preceding Job:</td>
</tr>
</tbody>
</table>

5.1.5.1  Individual Criteria

- **Job Name:**
  Represents the name of an ABAP job. Wildcards can be used.

- **Job Step No.:**
  The defined job step number is an important identification field for checking the criteria of a job step such as ABAP program, variant, external program, and external parameters.
  - When using the job name as identification criteria, the value of the job step number has to be 1.
  - When using the job step as identification criteria, ensure that the job step number is correct. Otherwise the job will be ignored in the data collection.

- **ABAP program:**
  This label represents the ABAP program defined for a job step. It is possible to use wildcards or to bypass the field without providing an entry. It has to be ensured that the step number is correct.

- **Variant:**
  This label represents the variant of the ABAP program defined for a job step. It is possible to leave this field blank to allow all variants. It has to be ensured that the step number and the ABAP program name are correct.

- **External program:**
  This label represents the external program defined for a job step. It is possible to use wildcards or to bypass the field without providing an entry. It has to be ensured that the step number is correct.

- **External parameters:**
  Parameters of an external program defined for a job step. For processing with an entry in this field, ensure that the job step number and the external program are correct.

- **User:**
  This label represents the user defined in the job step, and an entry is required. It is possible to use wildcards for this field. To allow all users, set the value to "**". The criteria cannot be initial. It has to be ensured that the job step number is correct.

- **Event ID:**
  This field is relevant for the "By event" start procedure only. During data collection, each found job is checked if the job was triggered by a corresponding event. Wildcards are not valid for this field.
- Event parameter:
  This field is relevant for the "By event" start procedure only. During data collection, each found job is checked if the job was triggered by a corresponding event.

- Preceding job:
  This field is relevant for the "By preceding job" start procedure only. During data collection, each found job is checked if the job was triggered by a preceding job.

**Note**

Even if a job was triggered by an event or by a preceding job, the usage of a corresponding start procedure ("By event" and "By preceding job") is not mandatory. In most cases, the "Use job start condition" start procedure is the better choice.

### 5.1.5.2 Available Key Figures per Start Procedure

The table provides the key figures for ABAP jobs per start procedure.

<table>
<thead>
<tr>
<th>Key figure</th>
<th>By time</th>
<th>Use job start condition</th>
<th>By event</th>
<th>By preceding job</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Duration</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Start Delay</td>
<td>X</td>
<td>X (technical delay only)</td>
<td>X (technical delay only)</td>
<td>X (technical delay only)</td>
<td></td>
</tr>
<tr>
<td>End Delay</td>
<td>If period = 0 or = 1440 min.</td>
<td>If period = 0 or = 1440 min.</td>
<td>If period = 0 or = 1440 min.</td>
<td>If period = 0 or = 1440 min.</td>
<td></td>
</tr>
<tr>
<td>Out of Time Window</td>
<td>If period = 0 or = 1440 min.</td>
<td>If period = 0 or = 1440 min.</td>
<td>If period = 0 or = 1440 min.</td>
<td>If period = 0 or = 1440 min.</td>
<td></td>
</tr>
<tr>
<td>Parallel Processing</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Not Started on Time</td>
<td>-</td>
<td>X (but not together with Job Active)</td>
<td>X (but not together with Job Active)</td>
<td>X (but not together with Job Active)</td>
<td>Each parameter set represents an expected schedule</td>
</tr>
<tr>
<td>Job Active</td>
<td>-</td>
<td>X (but not together with Not Started on Time)</td>
<td>X (but not together with Not Started on Time)</td>
<td>X (but not together with Not Started on Time)</td>
<td></td>
</tr>
<tr>
<td>Job Log Messages</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Job Log Content</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
5.1.6 BW Process Chain

Process Chain Header

Process Chain Element

5.1.6.1 Individual Criteria

- BW Process Chain ID:
  This field represents the technical name of a BW process chain. Wildcards are not valid for this field.

- Time to look back [days]:
  The data collector checks the status of long running jobs or process chains for the past day. This period can be adjusted. The number of days to be checked can be set for each monitoring object individually. This is useful for process chains that have a longer runtime.

- Process Type (only element):
  This field represents the type of the process chain element such as ABAP, LOADING, DROP_INDEX.

- Variant (only element):
  This field represents the variant of the process chain element

5.1.6.2 Available Key Figures per Start Procedure

The table provides the key figures for BW process chains per start procedure.

<table>
<thead>
<tr>
<th>Key figure</th>
<th>By time</th>
<th>Use job start condition</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Start Delay</td>
<td>X</td>
<td>X (technical delay only)</td>
<td></td>
</tr>
<tr>
<td>Key figure</td>
<td>By time</td>
<td>Use job start condition</td>
<td>Comment</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------</td>
<td>-------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>End Delay</td>
<td>If period = 0 or</td>
<td>If period = 0 or</td>
<td>Each parameter set represents an expected schedule. For elements it is possible to monitor the delay related to the start of the chain header.</td>
</tr>
<tr>
<td></td>
<td>= 1440 min.</td>
<td>= 1440 min.</td>
<td></td>
</tr>
<tr>
<td>Out of Time Window</td>
<td>If period = 0 or</td>
<td>If period = 0 or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 1440 min.</td>
<td>= 1440 min.</td>
<td></td>
</tr>
<tr>
<td>Not Started on Time</td>
<td>-</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Records Sent</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Data Packages Processed</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Job Log Messages</td>
<td>X</td>
<td>X</td>
<td>Only for chain steps based on an ABAP job.</td>
</tr>
<tr>
<td>Job Log Content</td>
<td>X</td>
<td>X</td>
<td>Only for chain steps based on an ABAP job.</td>
</tr>
</tbody>
</table>

### 5.1.7 SAP BusinessObjects Platform Job

#### 5.1.7.1 Individual Criteria

- **BO Job ID:**
  This field represents the job ID of a SAP BusinessObjects platform (SBOP) job. Wildcards are not valid for this field. This field is populated from the job selection popup and cannot be maintained manually.

- **Job Name:**
  This label represents title of the SBOP job. This field is populated from the job selection popup.
• Job Type: This label represents the kind of SBOP job. This field is populated from the job selection popup and cannot be maintained manually.

• Job Owner: This label represents the responsible party of the SBOP job, such as "Administrator". This field is populated from the job selection popup. The usage of wildcards is possible.

### 5.1.7.2 Available Key Figures per Start Procedure

The table provides the key figures for SBOP jobs per start procedure.

<table>
<thead>
<tr>
<th>Key figure</th>
<th>By time</th>
<th>Use job start condition</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Start Delay</td>
<td>X</td>
<td>X (technical delay only)</td>
<td></td>
</tr>
<tr>
<td>End Delay</td>
<td>If period = 0 or = 1440 min.</td>
<td>If period = 0 or = 1440 min.</td>
<td></td>
</tr>
<tr>
<td>Out of Time Window</td>
<td>If period = 0 or = 1440 min.</td>
<td>If period = 0 or = 1440 min.</td>
<td></td>
</tr>
<tr>
<td>Not Started on Time</td>
<td>-</td>
<td>X</td>
<td>Each parameter set represents an expected schedule</td>
</tr>
</tbody>
</table>

### 5.1.8 SAP Data Services Job

#### 5.1.8.1 Individual Criteria

• Repository Name: This field represents the repository of an SAP Data Service job. Wildcards are not valid for this field. This field is populated from the job selection popup and cannot be maintained manually.
- **Job Name:**
  This label represents the SAP Data Service job. Wildcards are not valid for this field. This field is populated from the job selection popup.

## 5.1.8.2 Available Key Figures per Start Procedure

The table provides the key figures for data services jobs per start procedure.

<table>
<thead>
<tr>
<th>Key figure</th>
<th>By time</th>
<th>Use job start condition</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Start Delay</td>
<td>X</td>
<td>X (technical delay only)</td>
<td></td>
</tr>
<tr>
<td>End Delay</td>
<td>If period = 0 or = 1440 min.</td>
<td>If period = 0 or = 1440 min.</td>
<td></td>
</tr>
<tr>
<td>Out of Time Window</td>
<td>If period = 0 or = 1440 min.</td>
<td>If period = 0 or = 1440 min.</td>
<td></td>
</tr>
<tr>
<td>Not Started on Time</td>
<td>-</td>
<td>X</td>
<td>Each parameter set represents an expected schedule</td>
</tr>
<tr>
<td>Records Read</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
5.1.9 SMSE Job

5.1.9.1 General Information

With SMSE jobs, all external scheduler job (definition) types including job (process) chains can be monitored. This flexibility is a major advantage for SMSE jobs.

To provide this flexibility, job data must be pulled, or read directly, from the external scheduler. The original implementation of the SMSE interface does not provide all application programming interfaces (APIs) for the required data retrieval. There are two options to retrieve job data for SMSE jobs from an external scheduler:

- For SAP Business Process Automation by Redwood (SAP BPA) or its predecessor SAP Central Process Scheduling by Redwood (SAP CPS) it is possible to use a remote (secondary) database connection.
- The APIs of an enhanced version of the SMSE interface provide the required functionality. The external scheduler must be certified for the extended SMSE interface.

With SAP Solution Manager 7.2, you can monitor jobs in SAP Business Process Automation by Redwood and SAP Central Process Scheduling by Redwood.

Though the data collection does not use the APIs of the current SMSE interface, the configuration UI does. If you choose the option to get job identification from the external scheduler, the value help is provided using the SMSE APIs. For this, the external scheduler should be connected to SAP Solution Manager.

5.1.9.2 Prerequisites

The configuration guide for Central Job Overview provides a documentation of the activities to be performed for Job Monitoring with SMSE jobs. Find the guide here: [http://service.sap.com/instguides](http://service.sap.com/instguides) → SAP Components → SAP Solution Manager → Release 7.2 → Additional Guides → Job & BI Monitoring

Required activities:

- Create a remote database connection to SAP Business Process Automation by Redwood or SAP Central Process Scheduling by Redwood, as detailed in chapter 3. The remote database connection is not required for the data retrieval via the enhanced SMSE interface.
- Maintain the configuration table SJ0_CONFIG as detailed in chapter 4. An external scheduler set represents a system of an external scheduler. The following parameters are mandatory for job monitoring with SMSE jobs and must be maintained per external scheduler set:
  - Scheduler: For data retrieval via remote database connection to SAP BPA or SAP CPS use "CPS". For data retrieval via enhanced SMSE interface use "SMSE".
5.1.9.3 Individual Criteria

- **Destination:**
  This mandatory field represents the RFC destination to the external scheduler certified for SMSE.

- **Isolation Group:**
  This mandatory field represents the external scheduler’s isolation group.

- **Queue:**
  This mandatory field represents the external scheduler’s queue.

- **Job Definition Type:**
  This mandatory field represents SAPR3, BODS, JobChain, and other types of job definitions in the external scheduler.

- **Job Definition:**
  This field represents the job definition in the external scheduler. The job definition must be provided without wildcards.

- **Is Job Chain:**
  This flag must be set to identify that the monitored job is a part of job chain.
  If the flag is checked, the hierarchy of the job chain will be searched for canceled elements when a job chain has canceled. In addition, the text of the cancelation metric will contain information as to which element caused the cancelation.

- **Check Job Parameters:**
  If the flag is checked, the parameters in the table below are used as identification criteria.
  The job definition in the external scheduler can be very generic such as “SAPAbapRun” in SAP CPS/BPA by Redwood. The important properties of the job, such as ABAP job name, are maintained as parameters. The parameters maintained in the table are used as identification criteria. It is possible to use wildcards in the parameter values.

  ![Note](image)

  If you choose "Get job identification - From External Scheduler" and select a job instance, all job parameters are transferred to the parameter list. Delete all parameters which are not required to identify the monitored job.
Note
Checking the parameters requires reading additional data from the external scheduler and processing them in the data collector. It is recommended to use the parameter check only if it is necessary.

5.1.9.4 Available Key Figures per Start Procedure

The table provides the key figures for SMSE jobs per start procedure.

<table>
<thead>
<tr>
<th>Key figure</th>
<th>By time</th>
<th>Use job start condition</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Start Delay</td>
<td>X</td>
<td>X</td>
<td>X (technical delay only)</td>
</tr>
<tr>
<td>End Delay</td>
<td>If period = 0 or &gt;= 1440 min.</td>
<td>If period = 0 or &gt;= 1440 min.</td>
<td></td>
</tr>
<tr>
<td>Out of Time Window</td>
<td>If period = 0 or &gt;= 1440 min.</td>
<td>If period = 0 or &gt;= 1440 min.</td>
<td></td>
</tr>
<tr>
<td>Not Started on Time</td>
<td>-</td>
<td>X</td>
<td>Each parameter set represents an expected schedule</td>
</tr>
</tbody>
</table>

5.2 Language

There are two language options:

- Alert Message Language:
  This defines the language in which the data collector returns the metric texts to SAP Solution Manager.

- Log Message Language:
  This defines the language in which the data collector returns job log messages to SAP Solution Manager.
5.3 Schedule

5.3.1 Usage of the Schedule Configuration in the Data Collector

5.3.1.1 Schedule Template

Schedule information in the configuration of a monitoring object is used to generate a schedule template in the data collector. The schedule template is generated and maintained as part of the activation of the monitoring object.

5.3.1.2 Daily Schedule

In the first data collection of a day for a monitoring object, a daily schedule is generated based on the schedule template. The daily schedule is maintained in the data collector.

The daily schedule is only generated, if the day itself is relevant for monitoring. The schedule types provide different ways to define whether a specific day is relevant for monitoring or not.

5.3.1.3 Influence of Daily Schedule on Data Collection

The data collector will generate a job instance for each job belonging to a monitoring object. Before the metrics for a job instance are determined, the data collector checks if the job instance is expected. The data collector checks if there is a corresponding entry in the daily schedule. The start procedure has an influence on this check. For more details see section 5.1.1.

- For the "Use job start condition" start procedure, the entry in the daily schedule is generated for each job instance. The check of the daily schedule reliably runs. Metrics are generated for each job instance.
- For the "By time" start procedure, the check against the daily schedule is very important. Only job instances fitting to the daily schedule will generate metrics and alerts.

Note

Start procedure "By time" in combination with a faulty schedule configuration is often the reason for missing metrics and alerts.
5.3.2 Schedule Types

There are different schedule types that can be used to define the relevant days for monitoring and the daily schedule. The daily schedule is always generated for the whole day. It is not possible to set smaller time intervals for monitoring via the standard schedule. Time intervals can be realized via a BAdI implementation. For details, reference section 7.2.

5.3.2.1 Simple Schedule

Simple schedule is the most common scheduling option. It features:

- **Days of the week:**
  The flags for the days of the week define which days are relevant for monitoring. For a weekday without flag, a daily schedule will not be generated. For this day, no metrics and alerts will be generated.

- **Planned Start Time:**
  The planned start time is the earliest time a job is expected.

- **Period [Minutes]:**
  The value in this field defines how often a job is expected. The value 0 is equal to 1440, and these values mean that the job is expected once per day.

The daily schedule is generated based on planned start time and period. See the influence of planned start time and period in an example below:

**Example:** Planned Start Time = 00:30:00 and Period [Minutes] = 240 will generate a daily schedule with values 00:30:00, 04:30:00, 08:30:00, 12:30:00, 16:30:00, 20:30:00.

→ 6 job instances of the monitoring object are expected.

It is possible to define several rows for a simple schedule. Doing so allows you to create a flexible schedule.

**Note**

For start procedure "Use job start condition", the fields "Planned Start Time" and "Period [Minutes]" are greyed out because they are not relevant.

5.3.2.2 Extended Schedule

Extended schedule is much more complex. It consists of several elements:
• Factory Calendar:
The factory calendar can be used to define the relevant days in a year. The factory calendar must be available in the system where the data collection happens. For ABAP jobs and BW process chains, the data collector is in the managed system. For all other job types, the data collector is in SAP Solution Manager.

• First Month:
This field provides the first month the job is expected. If a period is defined, valid months are calculated based on the first month and period.

• Period [Months]:
The value represents the scheduled job’s monthly periodicity. 0 means only in the first month, 1 means every month starting with the first month.

• First Start - Work Day
The value represents the begin of work days’ interval for the period (for example, second workday) following the factory calendar.

• First Start - Planned Start Time
See the description of planned start time for simple schedule in the previous section. For start procedure “By time”, this field and Period [Minutes] are used to determine the daily schedule.

• Last Start - Work Day
End of interval for work days (such as the fifth workday) of the period following the factory calendar.

• Last Start - Planned Start Time
At the last work day of a period, this time defines the latest planned start time of the daily schedule. The daily schedule will not provide any times later than this time.

• Period [Minutes]
See this description under the simple schedule section above.

1 Note
There can be only one row in the extended schedule. If there is a more complex schedule, a specific factory calendar could be used.

5.3.2.3 Fiscal Year Variant

Fiscal year variant is similar to the extended schedule.

• Fiscal Year Variant:
The fiscal year variant can be used to define the fiscal periods and relevant days in a year. The fiscal year variant must be available in the managed system.

• First Period:
This field provides the first fiscal period the job is expected.

• Period [Fiscal Year Periods]:
The value defines the periodicity of a job. 0 stands for the first fiscal year period, 1 stands for every fiscal year period starting with the first period.
• First Start - Work Day  
  Begin of interval for work days (such as second workday) of the period following the fiscal year variant.

• First Start - Planned Start Time  
  See description of planned start time for simple schedule. For start procedure "By time", this field and "Period [Minutes]" are used to determine the daily schedule.

• Last Start - Work Day  
  At the last work day of a period, this time defines the end of the daily schedule. The daily schedule will not provide any times later than this time.

• Last Start - Planned Start Time  
  At the last work day of a period, this value defines the latest planned start time in the daily schedule. The daily schedule will not provide any times later than this time.

• Period [Minutes]  
  See this description under the simple schedule section above.

Note  
  There can be only one row in the fiscal year variant schedule. If there is a more complex schedule, a specific fiscal year variant could be used.

### 5.3.3 Data Collection Frequency and Data Retention

Data collection period and data retention settings are maintained below the scheduling settings. The following sections describe the options in detail.

### 5.3.3.1 Critical Job and Data Collection Frequency

The data collection frequency can be set between 5 minutes and 5 hours in predefined steps. The flag "Critical Job" and "Data Collection Frequency" are related. Data collection frequency is set to 5 minutes when the critical job flag is checked. Afterwards, data collection frequency can be changed to any value.

Data collection frequency defines the time interval for calling the data collector. There are three data collector calls, visible in the Alerting Framework:

• The first data collector call is performed every 5 minutes and covers the monitoring objects with data collection frequency of 5 and 10 minutes.

• The second data collector call is performed every 15 minutes and covers the monitoring objects with data collection frequency of 15 and 30 minutes.

• The third data collector call is performed every hour and covers the monitoring objects with data collection frequency of 1, 2, and 5 hours.
5.3.3.2 Data Retention

The fields "Data Retention Period [Days]" and "Total number of instances" determine how long a job instance is visible in the job monitor. A job instance is no longer shown in the job monitor if the data retention period is exceeded or if the number of instances gets higher than the total number of instances. If the total number of job instances is exceeded within the data retention period, the oldest job instance will be removed.

These settings also determine how long the data are valid for event calculation within the Monitoring and Alerting Infrastructure (MAI). Only data within the lifetime is relevant for alert generation. The lifetime of an already generated alert is not affected by these settings.

Note

The data retention settings defined in the configuration do not influence the reorganization of data stored in the data collector.

5.3.3.3 Collect Data from External Scheduler

This flag indicates that the PUSH mode is active.

5.3.3.4 Time Zone

This field represents the time zone in which a job is scheduled, executed, and monitored. The time zone determines time-related key figures such as "Start delay", "Not Started on Time", "End Delay", and "Out of Time Window". The times maintained for these key figures are expected to be in the configured time zone.

In the job monitor, the time zone determines start and end times.

In alerts, the metric attributes provided in alert details show the time zone together with a UTC time stamp. As of SAP Solution Manager 7.2 SPS 6, timestamps appear in the designated time zone.

An external scheduler can manage jobs in different time zones. As job monitoring can use only one time zone, the time zone must be provided in the configuration.

In an ABAP system, jobs are scheduled in system time. Since the data collector is in the ABAP system, the system time zone can be determined. If there is a requirement to monitor ABAP jobs or BW process chains in a different time zone, the configured time zone can be maintained.

Note

The configured time zone is available for all job types in SAP Solution Manager 7.2.

5.4 Alert Configuration

In general, there are two types of key figures:
• Job-type independent key figures
  These key figures are available for all job types. They are calculated based on the status, start time, and end time of a job. Key figures: Status, Start Delay, End Delay, Out of Time Window, Not Started on Time

• Job-type dependent key figures
  The calculation of these key figures is using properties of the specific job type. Key figures: Parallel Processing, Job Active, Job Log Messages, Job Log Content, Records Sent, Data Packages Processed, Rows Read.

  1 Note
  The configuration UI’s “Quick Help” feature provides useful documentation of each key figure. To display this information, right-click in the white space beside a key figure and choose to display quick help.

5.4.1 Alerting Active

This is a general flag for the monitoring object. If switched off, no alerts will be generated for the monitoring object.

5.4.2 Alert Refers to Step

This flag is available for ABAP jobs only. If the flag is checked, the key figure is calculated for the job step defined in the identification criteria. Since start time, end time, and status of ABAP job steps are not stored in a database table, these attributes must be retrieved from the job log.

The job log of an ABAP job is not stored in a database table but in a file. Reading data from a file is much slower than reading data from a database table. In addition, the file access generates I/O and CPU load in the system. The mass access to job logs must be avoided.

Monitoring the status of a job step is problematic:

• Example 1: A job cancels before any step is started. The job log does not provide any information about a job step and there will not be any metric.

• Example 2: The monitoring object is configured for step counter 1. A job cancels at job step 2. Though the job was canceled, there will be a Status metric with rating Green as job step 1 was finished successfully.

  1 Note
  We recommend you to use the “Alert refers to Step” option in exceptional cases only.

5.4.3 Status (Cancellation)

This key figure is used to monitor the status of jobs. If a job is running or has been completed successfully, the rating of the key figure will be GREEN. If the job is canceled, the rating is set to the value which has been defined in the rating field in the alert configuration.
Note

"Status" in combination with "Alert Refers to Step" could lead to missing metrics or metrics with unexpected rating.

5.4.4 Duration

This key figure is calculated based on the current runtime of a job. The rating is determined using four threshold values:

- Lower Threshold for Red [min]
  This threshold is checked only when the job is in a final state (completed or canceled). If the runtime of the job is less than or equal to this threshold, the rating is set to RED.

- Lower Threshold for Yellow [min]
  This threshold is checked only when the job is in a final state (completed or canceled). If the runtime of the job is less than or equal to this threshold, the rating is set to YELLOW.

- Upper Threshold for Yellow [min]
  If the runtime of the job is greater than or equal to this threshold, the rating is set to YELLOW.

- Upper Threshold for Red [min]
  If the runtime of the job is greater than or equal to this threshold, the rating is set to RED.

There is a difference between a threshold value being initial or being 0. If the value is initial, the threshold is ignored. If the value is 0, this value is used to determine the rating.

5.4.5 Start Delay

This key figure is calculated using a job's expected start date and time, actual start date and time, or the current date and time of data collection if no job has been found. The expected start date and time depends on the start procedure of the monitoring object:

- Start procedure "Use job start condition"
  The job must be created and released in the ABAP system. The scheduled start date and time of the job is used in the metric calculation. The start delay, known as technical delay, is the difference between the job's scheduled start time, actual start time, or the time of the data collection. Reasons for a technical delay include job dispatcher blocked, and no free background process.

- Start procedure "By time"
  The expected start date and time are taken from the daily schedule of the monitoring object, which is defined using both the planned start time and the period. The start delay is the difference between the planned start time, the actual start time, or the time of the data collection.

  The metric calculation logic handles missing job instances corresponding to schedule entries. For example, a job for the monitoring object is expected at 01:00:00 and 02:00:00. The threshold for red (see the Duration section above) for start delay is set to 30 minutes. The first job of the day starts at 02:05:00.

  → There will be a RED rating for an initial job instance for start time 01:00:00 because no job instance is found. The job instance for the job at 02:05:00 will get a GREEN rating.
5.4.6 End Delay

This key figure is calculated based on the planned end time in the configuration, the end date and time of a job, or the current date and time of data collection. The current data and time is used, if the job is still running or if no job has been found. A yellow or red rating is returned by the data collector if the thresholds have been reached or exceeded.

The rating of the metric depends on the threshold values for yellow and red.

A green metric containing the final job delay is returned if the thresholds for yellow and red were not reached or exceeded, as soon as the data collection detects that the job is no longer running.

If the job is still running while the data collection is taking place, the following situations are possible:

- The current job delay does not reach or exceed the thresholds specified for yellow or red. The later data collection returns a green rating and the final delay when the job is in a final state of finished or canceled.
- The current job delay reaches or exceeds the thresholds specified for yellow. The yellow rating is returned to SAP Solution Manager, with the current delay. An additional red rating and the current or final delay are returned if a later data collection detects a delay that reaches or exceeds the threshold for red.
- The current job delay exceeds the thresholds specified for red. A red metric, containing the current job duration, is returned immediately. The metric will not be returned with the final job duration in this case.

Specify the thresholds according to your requirements. Leave yellow or red alert columns blank to avoid receipt of yellow and red alert notices.

To receive the final delay notice, regardless of whether the job still runs during the data collection, set the thresholds for yellow and red to values that will never be reached.

Note

Key figure "End Delay" cannot be used if the period of the monitoring object is less than one day.

5.4.7 Out of Time Window

Alerts if a job does not run in a specified time window. Specify the start and end of the time window, and the threshold values for yellow and red. If you do not want to receive yellow or red alerts, leave the field in the corresponding column blank.

Note

Key figure "Out of Time Window" cannot be used if the period of the monitoring object is less than one day.
5.4.8 Not Started on Time

Alerts the delayed start with respect to check times. This alert type applies if you have not specified a planned start time via the "Use job start condition" option. If a job was not started by the check time, an alert will be raised. If you define several check times for a job executed several times a day, the assumption is that the first job execution is started by the first check time, the second job by the second check time, and so on. Specify the check times and the rating of the alert to be raised.

Note
It is not possible to define a check time for YELLOW and a check time for RED for the same expected job instance.

Note
It is not possible to use key figure "Not Started on Time" and "Job Active" in one monitoring object.

5.4.9 Parallel Processing (ABAP Job)

This key figure allows to monitor the number of parallel jobs that match the identification data. An alert will be raised if the number of parallel jobs differs from the expected number of parallel jobs that is specified in the configuration. This alert type applies only if background processing is expected to be performed by a known number of background jobs.

Specify the expected number of jobs and the rating of alerts to be raised.

5.4.10 Job Active (ABAP Job)

This key figure monitors the time of inactivity between two similar jobs. The data collector checks if a job is active during data collection. If not, the time between the time of current data evaluation and the end time of the last job is measured. If the job is active during data collection, the measured time interval is zero.

The alert thresholds refer to the measured value of the time interval.

Specify the thresholds according to your requirements. If you do not want to receive yellow or red alerts, leave the field in the corresponding column blank.

This alert type only applies to jobs for which you have chosen the start procedure option "use job start condition", and for which the job name does not contain a wildcard.

There are two typical use cases for this key figure:

- A recurring job that runs a short time.
  For example, on a predecessor job’s completion, a successor job starts a short time afterwards. The key figure will generate an alert if the successor job is not started in time.
- Long running jobs with automatic restart or continuous jobs.
  The key figure is generating an alert if the job is finished (completed or canceled) and the successor job does not start in time.
1 Note

It is not possible to use key figures "Not Started on Time" and "Job Active" together in the same monitoring object.

5.4.11 Job Log Messages (ABAP Job and BW Process Chain Element)

Allows you to monitor the messages written to the job log while the job runs, as well as once the job is completed. If the number of messages in the job log is less than or equal to the lower threshold values or greater than or equal to the upper threshold values, an alert is raised. The rating of the alert depends on the yellow and red thresholds. Specify the message type, class, and number, and the threshold values for yellow and red. Wildcards can be used, but not for all three parameters. Specify the message type or message class.

If you do not want to receive yellow or red alerts for a specific threshold, leave the field in the corresponding column blank.

- Lower Threshold for Red
  This threshold is checked only if the job is in a final state (completed or canceled). If the number of messages in the job log is lower than or equal to the threshold, the rating is set to RED.

- Lower Threshold for Yellow
  This threshold is checked only if the job is in a final state (completed or canceled). If the number of messages in the job log is lower than or equal to the threshold, the rating is set to YELLOW.

- Upper Threshold for Yellow
  If the number of messages in the job log is greater than or equal to the threshold, the rating is set to YELLOW. This threshold is checked already while the job runs.

- Upper Threshold for Red
  If the number of messages in the job log is greater than or equal to the threshold, the rating is set to RED. This threshold is checked already while the job runs.

Example:
Requirement: The defined message should be in the log exactly once. If it is not in the log there should be a YELLOW rating. If it is in the log twice the rating should be YELLOW. For three messages or more, the rating should be RED.
Solution: Lower Threshold for Red should remain initial (blank). Lower Threshold for Yellow should be 0. Upper Threshold for Yellow should be 2. Upper Threshold for Red should be 3.

5.4.12 Job Log Content (ABAP Job and BW Process Chain Element)

Monitors job log messages as follows: Some applications create messages that provide information about a processed document volume, or a number of errors that occurred when the background job was executed. This volume information, known as counters, that are provided in the messages can be used to trigger alerts. The
volumes are accumulated if a job log message occurs several times. The metric cannot be used to look for a string in the message text.

You can define up to three counters for each job. For each counter, enter the message class and the number of the message that provides the counter information. Wildcards are not allowed.

Choose the number of the message variable that contains the counter information.

You can specify a short text (20 characters) for each counter. This text will be used in the alert message. If you leave this field blank, the technical name COUNTER<1...3> is used.

At least one threshold must be specified for each counter. If you enter a threshold value for a yellow alert only, you receive only a yellow alert. The same applies for red alerts.

The thresholds are applied similar to Job Log Messages (5.4.11)

5.4.13 Records Sent (BW Process Chain)

Alert on the number of records processed.
Specify the thresholds per your requirements. If you do not want to receive yellow or red alerts, leave the field in the corresponding column blank.

5.4.14 Data Packages Processed (BW Process Chain)

Alert on the number of data packages processed.
Specify the thresholds per your requirements. If you do not want to receive yellow or red alerts, leave the field in the corresponding column blank.

5.4.15 Rows Read (SAP Data Services Job)

Alert on the number of rows read.
Specify the thresholds per your requirements. If you do not want to receive yellow or red alerts, leave the field in the corresponding column blank.

5.5 Custom Alert Text

Customer alert text defines an alert text per monitoring object. For each job type there is a default text provided. This default text is visible as the description of the customer alert text. Additional text can be configured in the text editor box for custom description. It is possible to use variables, which are substituted by values when the alert is generated.
Note
Custom alert text is a generic functionality of MAI. There are many variables offered but most of them are restricted to specific monitoring types.

The following variables are available for job monitoring:
- \&CONTEXT\_NAME&
  Name of the monitoring object
- \&ADATE&
  Start date of the alert (in UTC), format YYYYMDD
- \&ATIME&
  Start date and time of the alert (in UTC), format HHMMSS
- \&ALERT\_NAME&
  Job type
- \&START\_TIME&
  Start date and time of the alert (in UTC), format YYYYMMDDHHMMSS
- \&END\_TIME&
  End date and time of the alert (in UTC), format YYYYMMDDHHMMSS
- \&SOLMAN\_SID&
  System ID of SAP Solution Manager
- \&SOLMAN\_INSTNO&
  Installation number of SAP Solution Manager

5.6 Incident Settings

In the incident settings, it is possible to select a predefined incident variant and to decide if automatic incidents are activated, deactivated or of the global settings are used.
MAI provides the possibility to define alert consumer variants. An incident variant defines the settings for the generation and distribution of incidents in Incident Management.

The highlighted advanced settings area is important if the subject or text of the incident should be customized. If required, the subject and long text can be defined by an implementation of BAdI BADI_DYN_INCI_NOTIF_MULTIPLE. Each implementation of this BAdI has a defined filter value. In the drop-down field in the highlighted area a filter value must be selected to use the corresponding BAdI implementation.


SAP Note 2435390 provides a sample implementation of the BAdI specifically for job monitoring. The sample implementation will add job-specific information to the incident.

### 5.7 Notification Settings

In the notification settings, it is possible to select a predefined notification variant and to decide if automatic notifications are activated, deactivated or if the global settings are used.
MAI provides the possibility to define alert consumer variants. A notification variant defines the settings for the generation and distribution of notifications (e-mail or SMS).

The highlighted advanced settings area is important, if the subject or text of the notification should be customized. If required, the subject and long text can be defined by an implementation of BAdI BADI_DYN_INCI_NOTIF_MULTIPLE. Each implementation of this BAdI has a defined filter value. In the drop-down field in the highlighted area a filter value has to be selected to use the corresponding BAdI implementation.


SAP Note 2435390 provides a sample implementation of the BAdI specifically for job monitoring. The sample implementation will add job-specific information to the notification.

**Note**

The advanced settings allow setting that alerts are sent or re-sent after a specific number of occurrences. These settings are currently not working for job monitoring, since an individual alert is generated for each problematic job instance.
5.8 Third-Party Alerting

In the third-party alerting settings, it is possible to select a predefined third-party component variant and to decide if third-party components are activated, deactivated or if the global settings are used.

The third-party component variant is used to assign a third-party connector. Details of third-party connectors are provided in the document.

Details for implementing third-party connectors can be found on the following Wiki page: https://wiki.scn.sap.com/wiki/display/TechOps/Alert+Consumer+BAdI+Interface

There is a sample implementation of this BAdI for job monitoring provided by SAP Note 2343725.
6 Generating and Activating a Monitoring Object

6.1 Versions of a Monitoring Object

A monitoring object can have three different versions:

- Saved version
  This is the version displayed in the configuration screen of the monitoring object.

- Generated version
  This version is generated from the saved version when you chose the generate option, and cannot be displayed in the configuration UI.

- Active version
  The settings of the generated version are copied to the active version when you choose the activate option, and are transferred to the data collector. The version cannot be displayed in the configuration UI.

The intention of the different versions is that a monitoring object can be changed and saved in the configuration UI without any impact on the active configuration. It is also possible to deactivate and activate the monitoring object without applying the saved version as the generated version is used during activation.

1. Note

If a monitoring object is deactivated, the active version will not be copied to the generated version. If the monitoring object is activated again the settings of the generated version are applied. These settings can be different to the previous active settings.

6.2 Actions for Monitoring Objects

6.2.1 Save

When a monitoring object is saved, the configuration is written to the saved version. If the configuration screen is closed and opened again, the saved version is displayed.

6.2.2 Generate

When you choose the generate option, the monitoring object is saved first. Following, the configuration is copied from the saved version to the generated version. In addition, the configuration is written to MAI tables to prepare the activation.
6.2.3 Activate

When you choose the activate option, the settings in the MAI tables are copied to the active version. In addition, the configuration (containing identification criteria, schedule template, and others) is transferred to the data collector via RFC. In the data collector, this information is stored and used during the data collection. Finally, the monitoring object is activated for data collection in the Alerting Framework.

If a monitoring object is active and you choose the activate option, the monitoring object will be deactivated first (see description below) and then reactivated based on the generated version.

6.2.4 Deactivate

The deactivation will remove the monitoring object from the Alerting Framework. All data of the monitoring object are deleted in the data collector. All job instances are deleted from Job Monitor.
7 Enhancements for Data Collector of Job Monitoring

7.1 Usage of Job Rules to Change Identification Criteria

BAdi /SOMO/UNIJOBMONRULE can be used to change the identification criteria of a monitoring object during data collection. For details see chapter 5.1.2.

7.2 Changing Daily Schedule, Job Instances and Metrics

The enhancement spot /SOMO/UNIJOBMON provides the BAdi definition /SOMO/UNIJOBMONDC_CUST which can be used to change the daily schedule, job instances and metrics during the data collections. This BAdi is available as of ST-PI 2008_1_7* SP 14 and ST-PI 740 SP 4. In lower support packages the BAdi is made available via SAP Note 2302253.

There are sample implementations of this BAdi provided by the following SAP Notes:

- SAP Note 2312030 provides a sample implementation for mass status and duration monitoring of ABAP jobs.
- SAP Note 2350461 - "Monitoring the start of an ABAP job relative to its predecessor with SAP Solution Manager" shows how to use method CHANGE_SCHEDULE to monitor job chains in ABAP.

7.2.1 Changing the Daily Schedule

Method /SOMO/IF_ENH_UNIJOBMONDC_CUST~CHANGE_SCHEDULE of the BAdi interface makes it possible to change (add, change, delete) the daily schedule after it has been determined by the standard logic.

Possible use cases:

- There is a requirement to not create alerts during a defined time interval of the day.
  - For start procedure "By time", remove all schedules in the time interval.
  - For start procedure "Use job start condition" the method /SOMO/IF_ENH_UNIJOBMONDC_CUST~CHANGE_JOBINSTANCES should be used to exclude job instances in the time interval.
- There is a requirement to monitor jobs with a complex schedule
  - For start procedure "By time" it is possible to define a daily schedule matching to the complex schedule.
  - For start procedure "Use job start condition" the method /SOMO/IF_ENH_UNIJOBMONDC_CUST~CHANGE_JOBINSTANCES should be used to exclude job instances following the complex schedule.
7.2.2 Changing Job Instances

Method /SOMO/IF_ENH_UNIJOBMONDC_CUST~CHANGE_JOBINSTANCES of the BAdI interface makes it possible to change (add, change or delete) job instances in a data collection run. This allows to delete unwanted job instances, such as job instances based on a complex schedule or because of the status.

SAP Note 2312030 provides a sample implementation for mass status and duration monitoring of ABAP jobs.

7.2.3 Changing Metrics

Method /SOMO/IF_ENH_UNIJOBMONDC_CUST~CHANGE_METRICS of the BAdI interface makes it possible to change (add, change, or delete) metrics in a data collection run before they are sent to SAP Solution Manager.

SAP Note 2312030 provides a sample implementation for mass status and duration monitoring of ABAP jobs.

7.3 Custom Job Types

7.3.1 Intention

As of SAP Solution Manager 7.2 SP05 you can freely define new job types for job monitoring and job management. If there is a requirement to monitor a job in a system which is not covered by the standard job types, this can be realized as a custom job type within the job monitoring framework.
7.3.2 Configuration

The configuration for custom job types can be found in step 2.7 "Custom Job Type Settings" of the job monitoring configuration (SAP Solution Manager Configuration -> Application Operations -> Job Monitoring).

7.3.2.1 Create a Custom Job Type

Choose the "New" option to create a custom job type and to provide a description. Maintain the detailed configuration for the job type in custom job type details:

- Maintain descriptions in different languages, if required.
- Define the job parameters.

- External Scheduler or Managed System: The selected option will appear in the creation screen for a monitoring object. The decision here is just for the text in this creation screen. It does not influence anything else.
- Parameter: Name of a parameter
- Parameter Group: Parameters can be grouped. Each group is displayed on a separate tab in the configuration UI (monitoring object)
- Order: This defines the sequence of the parameters in the UI
- Data Element: Definition of the data element for the parameter
- Value Help: If the flag is checked, a value help will be available in the configuration UI. The value help content is provided by a method of the BAdI implementation.
- Destination Relevant: The parameter is required to identify the system from which the job data are retrieved such as RFC Destination, URL. The parameter is mandatory in the configuration UI.
- Mandatory Scheduling: The parameter is mandatory in the scheduling UI of a Job Documentation.
- Mandatory Monitoring: The parameter is mandatory in the configuration UI for job monitoring.
7.3.3 BAdI Implementation

For each custom job type, there must be an implementation of BADI_AGS_EJR_CUST_JOB (enhancement spot AGS_EJR_CUST_JOB). The name of the custom job type must be used as filter value for parameter CUSTOM_JOB_TYPE in the implementation.

The interface used by the BAdI has several methods which will be explained below.

The following methods are relevant for job monitoring:

- SEARCH_JOBS (mandatory)
- GET_JOBS_DATA (mandatory)
- GET_JOBS_PARAMETERS (mandatory, except all job parameters are returned by the two previous methods already)
- GET_DESCR_FOR_EXT_STATUS (optional, used in metric text)
- GET_VALUE_HELP (optional, used in configuration UI)

### 7.3.3.1 GET_DESCR_FOR_EXT_STATUS (Static)

This method can be used to provide the language-dependent description for a job status.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV_SID</td>
<td>Importing</td>
<td>Extended system ID</td>
</tr>
<tr>
<td>IV_EXT_STATUS</td>
<td>Importing</td>
<td>External status</td>
</tr>
<tr>
<td>IT_DEST_PARAMS</td>
<td>Importing</td>
<td>Table of destination-relevant parameters</td>
</tr>
<tr>
<td>IV_LANGU</td>
<td>Importing</td>
<td>Language (optional)</td>
</tr>
<tr>
<td>CV_DESCR</td>
<td>Changing</td>
<td>Status description</td>
</tr>
</tbody>
</table>

### 7.3.3.2 GET_VALUE_HELP (Static)

This method is used to provide a value help for a parameter. It is only possible to provide the parameter name without selection criteria.
### 7.3.3.3 SEARCH_JOBS

The method `SEARCH_JOBS` selects jobs from a managed system. It is mandatory for job monitoring. It will be called by the data collector to select new jobs.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV_SID</td>
<td>Importing</td>
<td>Extended system ID</td>
</tr>
<tr>
<td>IV_PARAM</td>
<td>Importing</td>
<td>Name of parameter</td>
</tr>
<tr>
<td>IT_DEST_PARAMS</td>
<td>Importing</td>
<td>Table of destination-relevant parameters</td>
</tr>
<tr>
<td>IV_LANGU</td>
<td>Importing</td>
<td>Language (optional)</td>
</tr>
<tr>
<td>CV_VALUES</td>
<td>Changing</td>
<td>Result table</td>
</tr>
</tbody>
</table>

The method `SEARCH_JOBS` selects jobs from a managed system. It is mandatory for job monitoring. It will be called by the data collector to select new jobs.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV_SID</td>
<td>Importing</td>
<td>Extended system ID</td>
</tr>
<tr>
<td>IV_FROM_DATE</td>
<td>Importing</td>
<td>Start date for job search</td>
</tr>
<tr>
<td>IV_FROM_TIME</td>
<td>Importing</td>
<td>Start time for job search</td>
</tr>
<tr>
<td>IV_TO_DATE</td>
<td>Importing</td>
<td>End date for job search</td>
</tr>
<tr>
<td>IV_TO_TIME</td>
<td>Importing</td>
<td>End time for job search</td>
</tr>
<tr>
<td>IT_DEST_PARAMS</td>
<td>Importing</td>
<td>Table of destination-relevant parameters</td>
</tr>
<tr>
<td>IV_JOB_DOC_ID</td>
<td>Importing</td>
<td>Job Documentation ID</td>
</tr>
<tr>
<td>IT_STATUSES</td>
<td>Importing</td>
<td>Table of job statuses</td>
</tr>
<tr>
<td>IT_PARAMETERS</td>
<td>Importing</td>
<td>Table of selection ranges for parameters</td>
</tr>
<tr>
<td>CT_JOBS</td>
<td>Changing</td>
<td>Result table for selected jobs</td>
</tr>
</tbody>
</table>

The data element `AGS_EJR_CUST_JOB_SEL_PARAM` for parameter `IT_PARAMETERS` provides a nested table. For each parameter (field `PARAM_NAME`) it is possible to provide a selection range table `PARAM_RANGE`. Each row of the selection range table consists of the fields `SIGN`, `OPTION`, `LOW`, and `HIGH`.

### 7.3.3.4 GET_JOBS_DATA

This method is used to read data for a list of job IDs. It is mandatory for job monitoring. It is used to update the status of jobs.
### 7.3.3.5 GET_JOBS_PARAMETERS

This method is used to read parameters for a list of job IDs. This method must be implemented if methods SEARCH_JOBS and GET_JOBS_DATA are not returning all required parameters. It makes sense to split this if there are parameters which are required only for some jobs and if there is additional effort required to retrieve these parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV_SID</td>
<td>Importing</td>
<td>Extended system ID</td>
</tr>
<tr>
<td>IT_DEST_PARAMS</td>
<td>Importing</td>
<td>Table of destination-relevant parameters</td>
</tr>
<tr>
<td>IT_JOBS</td>
<td>Importing</td>
<td>Table of Job IDs</td>
</tr>
<tr>
<td>CT_JOBS_PARAMS</td>
<td>Changing</td>
<td>Result table for job data</td>
</tr>
</tbody>
</table>

### 7.3.3.6 SCHEDULE_JOB

This method is used to schedule a job. It is used in the scheduling UI of a job documentation.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV_SID</td>
<td>Importing</td>
<td>Extended system ID</td>
</tr>
<tr>
<td>IV_JOB_DOC_ID</td>
<td>Importing</td>
<td>Job Documentation ID</td>
</tr>
<tr>
<td>IV_START_DATE</td>
<td>Importing</td>
<td>Scheduled start date</td>
</tr>
<tr>
<td>IV_START_TIME</td>
<td>Importing</td>
<td>Scheduled start time</td>
</tr>
<tr>
<td>IT_DEST_PARAMS</td>
<td>Importing</td>
<td>Table of destination-relevant parameters</td>
</tr>
<tr>
<td>IT_PARAMETERS</td>
<td>Importing</td>
<td>Table with job parameters</td>
</tr>
</tbody>
</table>
Parameter | Type | Description
--- | --- | ---
CV_JOB_ID | Changing | Job ID of the new job

### 7.3.3.7 CHANGE_JOB

This method is used to change a job. It is used in the scheduling UI of a job documentation.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV_SID</td>
<td>Importing</td>
<td>Extended system ID</td>
</tr>
<tr>
<td>IV_JOB_ID</td>
<td>Importing</td>
<td>Job ID of job to be changed</td>
</tr>
<tr>
<td>IV_JOB_DOC_ID</td>
<td>Importing</td>
<td>Job Documentation ID</td>
</tr>
<tr>
<td>IV_START_DATE</td>
<td>Importing</td>
<td>Scheduled start date</td>
</tr>
<tr>
<td>IV_START_TIME</td>
<td>Importing</td>
<td>Scheduled start time</td>
</tr>
<tr>
<td>IT_DEST_PARAMS</td>
<td>Importing</td>
<td>Table of destination-relevant parameters</td>
</tr>
<tr>
<td>IT_PARAMETERS</td>
<td>Importing</td>
<td>Table with job parameters</td>
</tr>
<tr>
<td>CV_JOB_ID</td>
<td>Changing</td>
<td>Job ID of the changed job</td>
</tr>
</tbody>
</table>

### 7.3.3.8 CANCEL_JOB

This method is used to cancel a job. It is used in the scheduling UI of a job documentation.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV_SID</td>
<td>Importing</td>
<td>Extended system ID</td>
</tr>
<tr>
<td>IV_JOB_ID</td>
<td>Importing</td>
<td>Job ID of job to be changed</td>
</tr>
<tr>
<td>IT_DEST_PARAMS</td>
<td>Importing</td>
<td>Table of destination-relevant parameters</td>
</tr>
</tbody>
</table>

### 7.3.3.9 Exception class CX_AGS_EJR_CUST_JOB

In the implementation of the methods, the exception class CX_AGS_EJR_CUST_JOB can be used to raise an exception. Every exception of this class is caught in the coding calling the BAdI methods.