

# Customer Demo: Integration between SAP Business Workflow and BRFplus



## Applies to

Integration scenarios of SAP Business Workflow and Business Rule Framework plus (BRFplus) based on SAP NetWeaver 7.02 SP6 or above.

## Summary

This document describes a demo which in detail demonstrates the different integration scenarios between SAP Business Workflow and Business Rule Framework plus (BRFplus).

The demo shows how business logic defined in a BRFplus application can be used to control a workflow process. Furthermore, it demonstrates how existing workflow templates can be triggered out of a BRFplus application.

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## Demo overview

The demo described in this document gives an overview of the existing integration possibilities between SAP Business Workflow and Business Rule Framework plus (BRFplus). In the following section, we give a short introduction into these two technical frameworks.

### SAP Business Workflow

SAP Business Workflow can be used to define business processes that are not yet mapped in the SAP system. These may be simple release or approval procedures, or more complex business processes such as creating a material master and the associated coordination of the departments involved. SAP Business Workflow is particularly suitable for situations in which work processes have to be run through repeatedly, or situations in which the business process requires the involvement of a large number of agents in a specific sequence.

### Business Rule Framework plus

BRFplus is the business rules system of SAP NetWeaver ABAP. It is a comprehensive framework which helps business and IT users to model rules used for automatic decision support in business cases of all kinds. In addition, a flexible open API facilitates experienced IT users to extend the framework to their specific needs. Advanced features such as browser-based UI, traceability, and simulation eases the effort and time invested in implementing policies and rules.

### System requirements

- SAP NetWeaver 7.02 SP6 or above

### Context of the demo

The demo simulates a leave request of an employee who is member of a financials department. If the planned time of absence is less than 30 days, the absence of the employee will only be approved or rejected by the manager (one-step approval). (To keep the demo simple, the time of absence will be calculated in calendar days between the first day and the last day of absence without taking weekends or public holidays into account.)

If the time of absence is 30 days or more, a two-step approval is needed. In this case, the leave request will first be sent to the supervisor of the employee. If the supervisor has approved, the leave request will be sent to the HCM department where a HCM clerk needs to make a second approval. If both the supervisor and the HCM department have approved the employee's leave request, and if the employee is working in the financials department, a second workflow will be triggered automatically with a message for the supervisor to take a temporary replacement of the employee into account.

The workflow ends if the leave request of the employee has been approved successfully or if, in the course of the process, either the supervisor or the HCM department rejects the employee's leave request. In case of rejection, the leave request will be automatically deleted by the system and an appropriate message will be sent to the workflow inbox of the employee.

In the following screenshots you can see the complete designs of the two mentioned workflows. First the main workflow, second the subworkflow for the temporary replacement message to the supervisor.

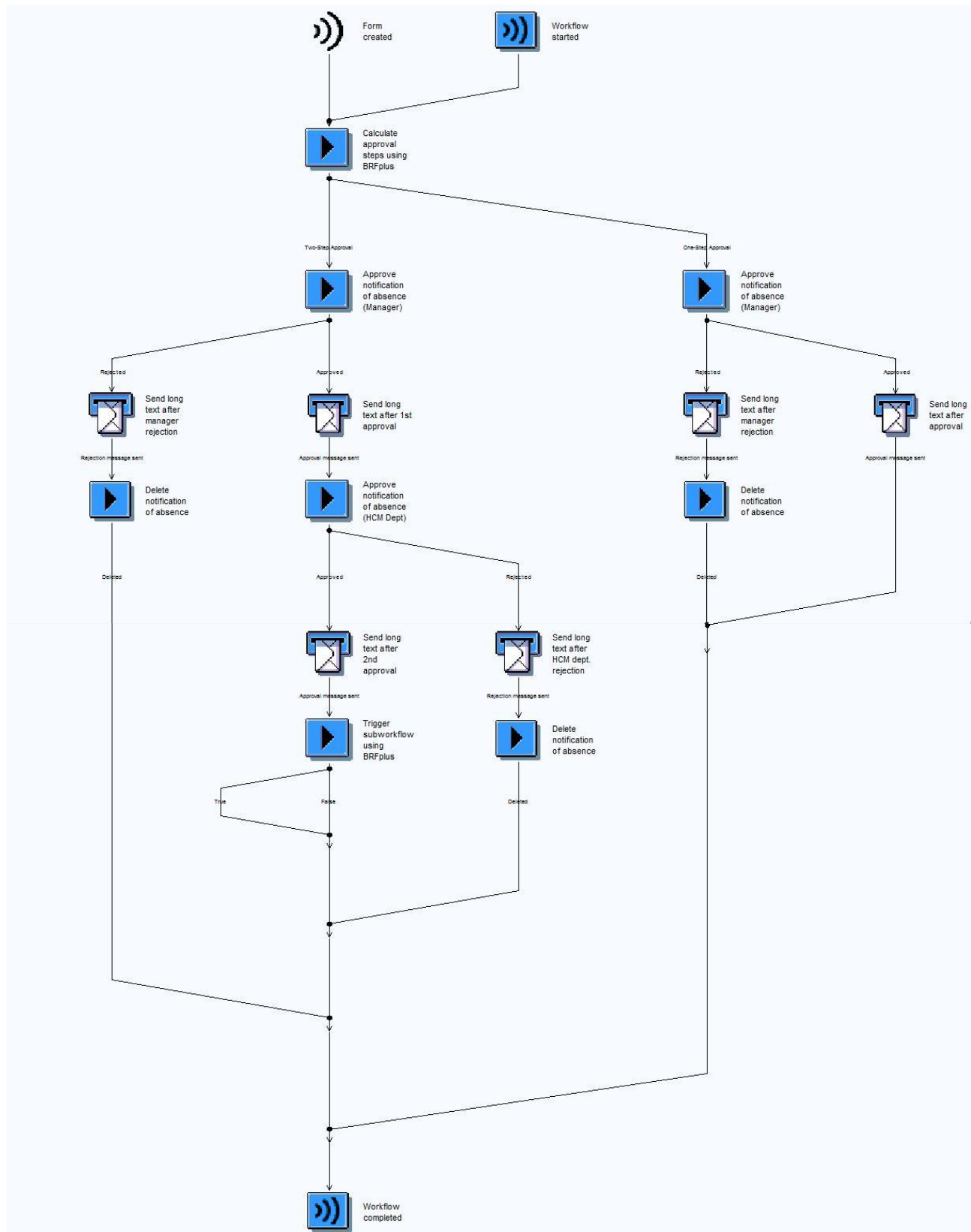


Figure 1: Design of the main workflow

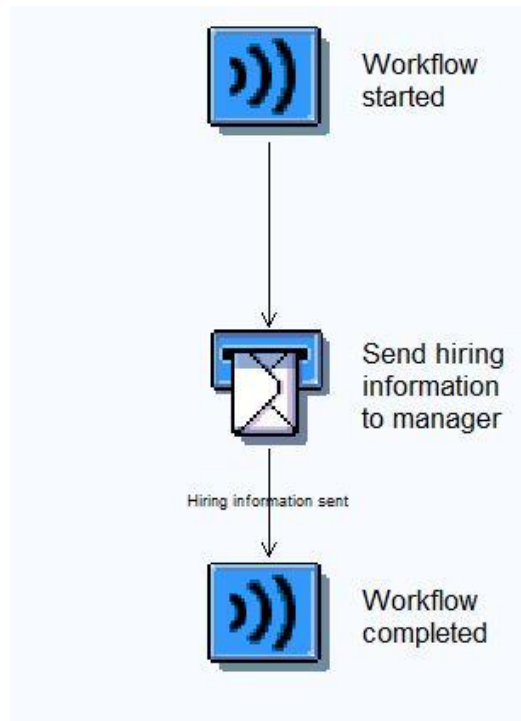


Figure 2: Design of the subworkflow

## The demo step-by-step

In this section, a high-level step-by-step description of the demo is given.

1. By using the transaction WF\_BRF\_LEAVE the employee creates a leave request.

Create Notification of Absence					
<b>Application Data</b>					
Number	11087		Status	New	
<b>Personal Data</b>					
Name	Ann Peters				
Department	Financials				
Personnel no.	12345	Cost center			
<b>Absence Data</b>					
	By	to	Hours	Leave Type	
Leave 1	01.02.2011	31.03.2011		R Vacation	
Leave 2				R Vacation	
Leave 3				R Vacation	
Reason					
Contact at					
<b>Entry and Approval</b>					
Date	27.01.2011	Date			
Issuer	BRF_USR1	Approver			

Figure 3: Create Notification of Absence

2. In the background, the system calculates the overall days of absence using BRFplus and decides whether a one-step or a two-step approval is needed for the request. (The integration of the BRFplus application and the defined decision table is described in the next section.)

The screenshot shows the configuration for a task named 'Calculate Approval Steps' (ID TS55700011). The step name is 'Calculate approval steps using BRFplus'. The binding is set to 'Binding (Exists)'. The 'Agents' section is empty. The 'Task Properties' section shows 'Agent Assignment' and 'Background Processing' as active, and 'Task Complete' and 'Confirm End of Processing' as inactive.

Figure 4: BRFplus activity "Calculate Approval Steps"

3. The leave request is sent to the supervisor of the employee. The supervisor (agent of the workflow step) is determined using a standard workflow rule (ID 168).

The screenshot shows the configuration for a task named 'Approve notification of absence' (ID TS55700012). The step name is 'Approve notification of absence (Manager)'. The binding is set to 'Binding (Exists)'. The 'Agents' section shows 'AC Rule' set to '00000168' with the role 'Superior (as user) for ...'. The 'Excluded' section shows '& WF\_INITIATOR&' with the role 'Initiator of Workflow Instan...'. The 'Task Properties' section shows 'Agent Assignment' and 'Background Processing' as active, and 'Task Complete' and 'Confirm End of Processing' as inactive.

Figure 5: Workflow activity for absence approval by manager

4. The supervisor of the employee opens his Workflow Inbox using transaction SBWP and receives the leave request as a work item.

The screenshot shows the SAP Business Workflow Inbox (SBWP) with a work item for 'Employee Ann Peters: Approve notification of absence'. The work item details are as follows:

Ex...	Title	Status	Creation Da...	Creation ...	Pr...	At...	Co...	W...
	Employee Ann Peters: Approve notification of absence		27.01.2011	14:25:59	5			

The work item description is: 'Employee Ann Peters submitted a notification of absence on 27.01.2011. Please make a decision about the request. If you reject the request, please create an attachment explaining your reason for the rejection.'

The objects and attachments are: 'Notif. of Absence: Ann Peters from 01.02.2011 to 31.03.2011'.

Figure 6: Absence approval decision by manager

After opening the work item, the supervisor can approve or reject the leave request. The long text of the work item provides all needed information (name of the employee, first and last day of absence, etc.).

5. If the supervisor rejects, the workflow ends and the request is deleted by the system. Additionally, an appropriate rejection message is sent to the employee's workflow inbox. If the supervisor approves, the next workflow step depends on the overall number of absence days, i.e. whether the workflow is in the one-step or in the two-step approval mode.
6. In case of a one-step approval process, a message is sent to the workflow inbox of the employee to let the requestor know that the supervisor has approved the request.

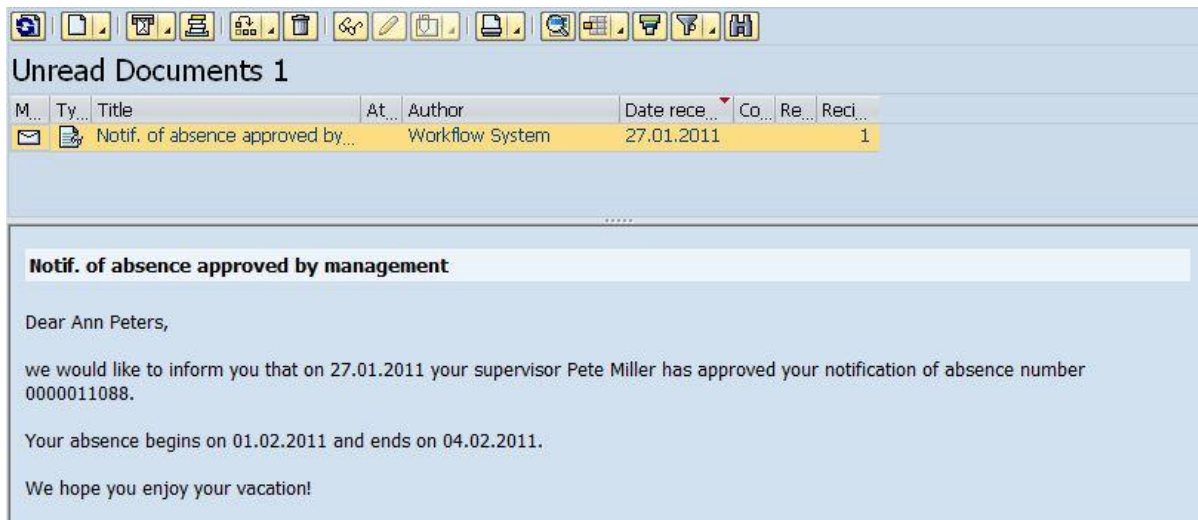


Figure 7: Absence approval message for employee after one-step approval

7. In case of a two-step approval process, a message is sent to the workflow inbox of the employee to let the requestor know that the supervisor (as the first approver) has approved the request and that the request has been forwarded to the HCM department for second approval.



Figure 8: 1st approval message for employee in two-step approval process

The responsible HCM agents are determined using the organizational unit of the HCM department defined in Organizational Management in the SAP system.

Task: TS55700022 Approve notification of absence

Step Name: Approve notification of absence (HCM Dept)

Binding (Exists)

Agents:

O Organizational Unit: 50000529 BRF+ Demo - HCM Departm...

Excluded: & WF\_INITIATOR& Initiator of Workflow Instan...

Task Properties:

☒ Agent Assignment ☒ Task Complete

☒ Background Processing ☒ Confirm End of Processing

Figure 9: Workflow activity for absence approval by HCM department

8. All HCM clerks assigned to the HCM department in Organizational Management receive the leave request as a work item. Based on the Workflow Standard, the first clerk opening the work item becomes the owner of the request and the work item is automatically deleted from the Workflow Inbox of all other clerks.

Workflow 1

Ex...	Title	Status	Creation Da...	Creation ...	P...	At...	Co...	W...
	Employee Ann Peters: Approve notification of absence		27.01.2011	14:42:37	5			

Tips & tricks: Sort work items...

**Employee Ann Peters: Approve notification of absence**

**Description**

Employee Ann Peters submitted a notification of absence on 27.01.2011.

Please make a decision about the request. If you reject the request, please create an attachment explaining your reason for the rejection.

Please be informed that the supervisor of employee Ann Peters has already approved the leave request as first approver.

**Objects and attachments**

- Notif. of Absence: Ann Peters from 01.02.2011 to 31.03.2011

Figure 10: Absence approval decision by HCM department

After opening the work item, the HCM clerk can approve or reject the leave request. In the long text of the work item, all needed information is provided (name of the employee, first and last day of absence, etc.). There is also a remark in the message mentioning that the supervisor of the employee has already approved the request.

9. If the HCM clerk rejects, the workflow ends and the request will be deleted by the system. Additionally an appropriate rejection message is sent to the employee's workflow inbox. If the HCM clerk approves, a message is sent to the workflow inbox of the employee to let the requestor know that both the supervisor and the HCM department have approved the request.

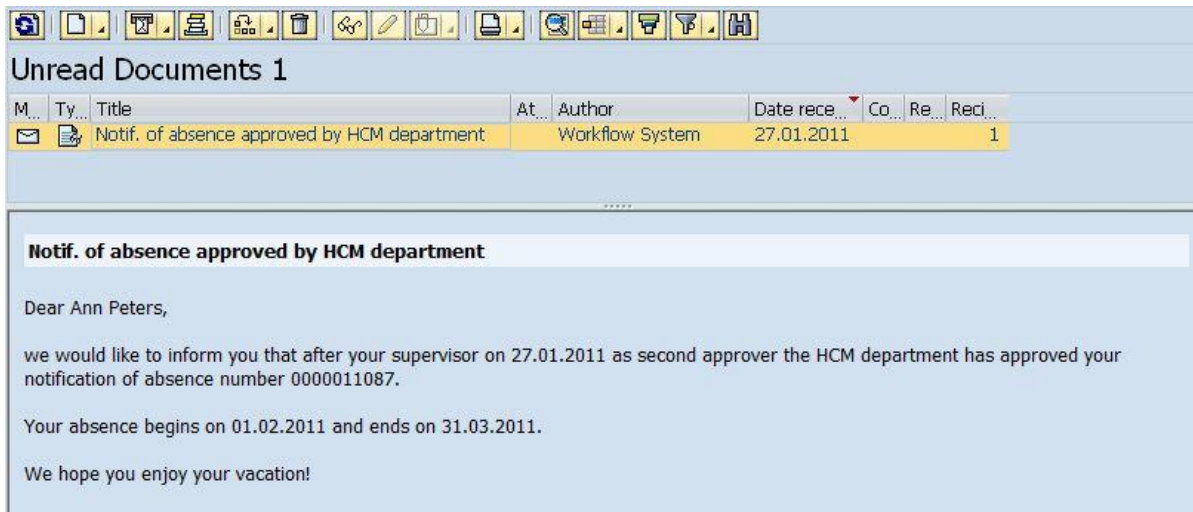


Figure 11: 2nd approval message for employee in two-step approval process

10. In the last step of the workflow, a second workflow using BRFplus is triggered if the employee works in the financials department. This workflow sends a message to the supervisor that recommends taking a temporary replacement into account. (The integration of the BRFplus application and the defined decision table is described in the next section.)

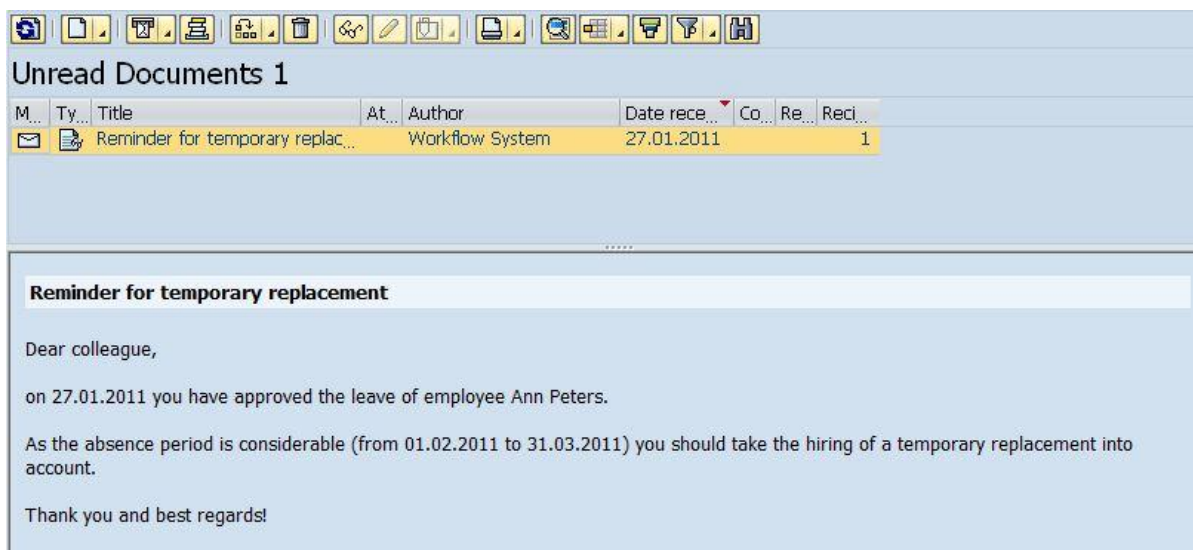


Figure 12: Additional management information about temporary replacement

## Integration Aspects

In this section, the integration aspects used in the demo between SAP Business Workflow and BRFplus is described in detail.

### Integration of BRFplus into SAP Business Workflow

With SAP NetWeaver 7.02 SP6 or above, a workflow developer can create BRFplus activities in the workflow model. Generally, the workflow tasks behind BRFplus activities are automatically created by the system and are defined for background processing. Using this integration scenario, a BRFplus application can be inserted into the workflow logic within transaction SWDD (Workflow Builder).

In step 2 of the workflow process described above, a BRFplus activity is used to calculate the overall number of absence days and thus to decide whether the workflow will continue with the one-step or the two-step approval process. In section "Context of the demo" you have the full overview of the workflow, where you can see that in the two-step approval branch additional steps for the second approval will be performed.

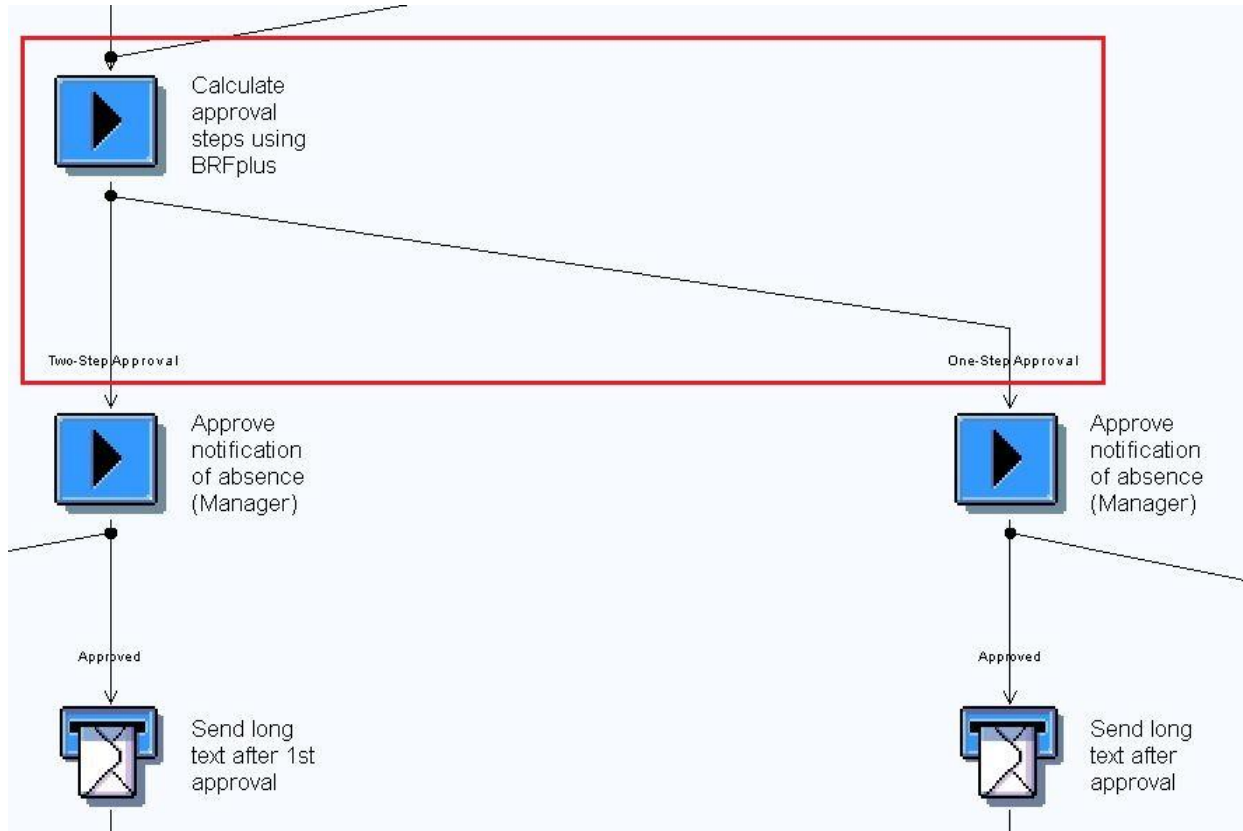


Figure 13: BRFplus activity "Calculate approval steps" within the workflow logic

To accomplish this, the following workflow container elements are imported into and exported from the particular BRFplus application:

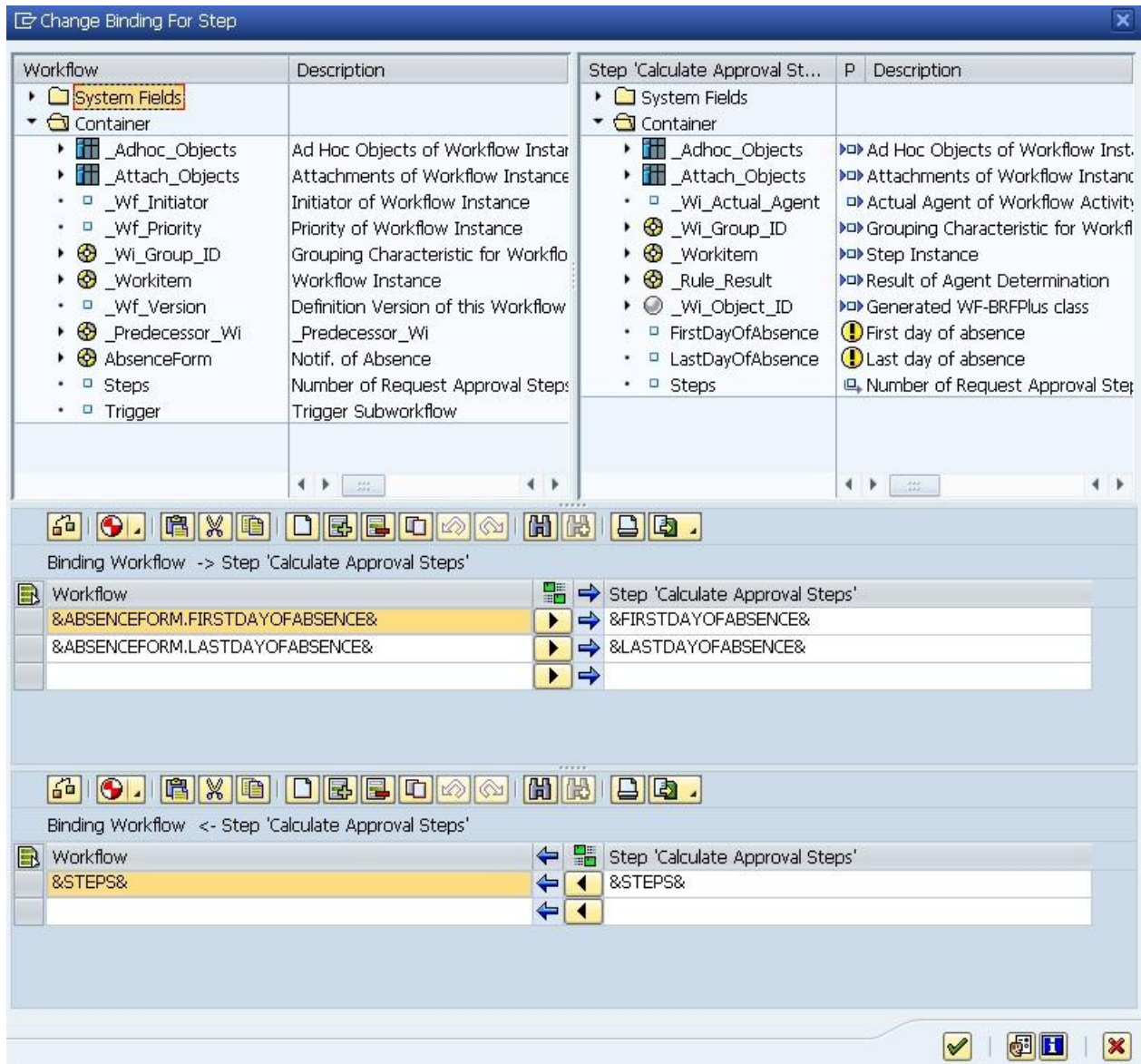


Figure 14: Data binding for BRFplus activity "Calculate approval steps"

Within the BRFplus application, the overall number of absence days is calculated with a custom formula "Days of Absence". Within this formula, the standard formula function for calculating time duration in days (DT\_DURATION\_DIFF\_INT\_DAYS) will be used as shown in the screenshot below.

The screenshot shows the BRFplus formula editor for the formula 'Days of Absence'. The left sidebar displays the repository structure, including the application 'WF\_AP\_S\_20101026112248' and its elements. The main area is divided into 'General' and 'Detail' tabs. The 'General' tab shows the formula name 'WF\_BRF\_FO\_ABSENCE\_DAYS', short text 'Days of Absence', application 'WF AP S\_20101026112248', and access level 'Application'. The 'Detail' tab shows the result data object 'Days of Absence' and the formula expression: `Days of Absence = DT_DURATION_DIFF_INT_DAYS ( Absent from (1st day) , to (last day) )`. Below the expression, there is a 'Context' table and a calculator interface.

Name	Description
WF_DO_FIRSTDAYOFABSENCE	Absent from (1st day)
WF_DO_LASTDAYOFABSENCE	to (last day)
WF_DO_STEPS	Steps

Figure 15: BRFplus formula "Days of Absence"

This formula is then used in the custom decision table "Approval Steps" of the BRFplus application to define whether a one-step or a two-step approval is needed for the current leave request.

The screenshot shows the BRFplus decision table editor for the decision table 'Approval Steps'. The left sidebar displays the repository structure, including the application 'WF\_AP\_S\_20101026112248' and its elements. The main area is divided into 'General' and 'Detail' tabs. The 'General' tab shows the decision table name 'WF\_BRF\_DT\_APPROVAL\_STEPS', short text 'Approval Steps', application 'WF AP S\_20101026112248', and access level 'Application'. The 'Detail' tab shows the table contents with two rows: one for 'Days of Absence' between 10 and 29, and another for 'Days of Absence' greater than or equal to 30. The 'Steps' column shows the number of steps required for each condition.

Days of Absence	Steps
10..29	1
>=30	2

Figure 16: BRFplus decision table "Approval Steps"

Depending on the value of the returning parameter "Steps", the workflow continues with the branch for the one-step or for the two-step approval.

Note that data exchange between a workflow and a BRFplus function is supported for elementary data types only. Moreover, additional measures have to be taken for elementary data objects that have a slightly higher inner complexity, namely data objects of type amount, quantity, or timepoint. These data objects are considered as elementary, but actually consist of two components, namely a number plus a currency, unit of measure, or time unit, respectively. Mapping both fields of this kind of data objects from a workflow container to a corresponding BRFplus data object does not work properly. To overcome this problem, we recommend the following workaround (shown for an amount scenario that you can apply to quantities or timepoints accordingly):

1. In the workflow container, provide two separate fields for amount ("Amount") and currency ("Currency"). Assign them to data types CURR and CUKY. In case you have both fields in one structure it is important that the currency is not maintained as reference field for the amount. Otherwise, the currency field would vanish in the corresponding BRFplus structure.
2. In the signature of the generated BRFplus function, the two fields will appear as elements "Amount" of BRFplus type Amount and "Currency" of BRFplus type Text. However, you will notice that the currency field in the "Amount" remains empty when the BRFplus function is executed.
3. To ensure that you can work with the "Amount" without further restriction, you need to provide the currency information from the "Currency" field manually. We recommend using a formula expression in the first rule of the ruleset for this purpose. The formula may have the following appearance: `AMOUNT = TO_AMOUNT ( TONUMBER ( AMOUNT ), CURRENCY )`. The following three screenshots of function, a ruleset, and a formula expression demonstrate how this can be accomplished.

**Business Rule Framework plus**

Function: WF\_FU\_20131211162201

General

Detail

Simulation Debugger Traces Generate Create Code Template Advanced Checks

Mode: Event Mode

The function is set to event mode. On the 'Rulesets' tab you can view the assigned rulesets and also create new ones.

Signature Assigned Rulesets Code Generation

**Context**

Component Name	Text	Type
AMOUNT	Amount	Element (Amount)
CURRENCY	Currency	Element (Text)

**Result Data Object**

Data Object: FDT\_RESULT

The Context contains the import parameters of the function. The Result Data Object returns the result of the function.

Figure 17: BRFplus function with signature

**Ruleset: WF\_RS\_20131211162201**

Back Display Check Save Activate Transport Delete More

### General

### Detail

Hide Ruleset Header Context Overview

Enabled: ☒ Number of Rules: 2  
 Function: WF\_FU\_20131211162201 Number of Variables: 0  
 Precondition: <Not assigned> Priority: 00

**Variables** (1) <Not assigned>  
**Expressions Which Initialize the Variables** (1) <Not assigned>

### Rules

Insert Rule Insert Exit Condition

(1) Rule: No description is available - Rule has not been defined  
 (1) Change AMOUNT after processing f FO\_AMOUNT\_COMPOSED

(2) Rule: No description is available - Unlimited Validity

Figure 18: Ruleset with initial call of formula expression

**Formula: FO\_AMOUNT\_COMPOSED**

Back Display Check Save Activate Transport Delete More

### General

### Detail

Switch to Expert Mode Context Overview Start Simulation

Result Data Object: AMOUNT

AMOUNT = TO\_AMOUNT ( TONUMBER ( AMOUNT ) , CURRENCY )

Move Cursor Move Token Delete Token

Selected Element: Data Object 'CURRENCY'

### Context

Name	Description
AMOUNT	Amount
CURRENCY	Currency
FDT_RESULT	Number

### Formula Functions

Name	Description	Documentation
ABS	Absolute Value	Show
AND	Boolean operator AND	Show
ARCCOS	Arccosine	Show
ARCSIN	Arcsine	Show
ARCTAN	Arctangent	Show
CONCATENATE	Concatenate two strings	Show
CONCATENATE_STRUCTURE	Concatenate the values in a structure	Show
CONCATENATE_TABLE	Concatenate the values of an unstructured table	Show
CONDENSE	Trims off leading and trailing white space	Show
CONVERT_AMOUNT	Converts an amount to the specified currency	Show
CONVERT_QUANTITY	Converts a quantity to the specified unit	Show

The context data objects offered in the list are taken from the context of the function by which the formula is called. You can access other data objects and expressions via the context menu.

Hide Quick Help

Figure 19: Formula expression restoring a BRFplus Amount data object from the number part of an amount parameter and a currency provided in a separate parameter

## Integration of SAP Business Workflow into BRFplus

The integration between SAP Business Workflow and BRFplus also works the other way around. This is shown in the demo as well. It is possible to trigger an existing workflow from a BRFplus application using the standard BRFplus action type "Start Workflow".

In the demo, a workflow which informs the supervisor about the possible need of a temporary replacement is triggered after both parties (the supervisor and the HCM department) have approved the employee's leave request and if the employee is working in the financials department.

To accomplish this, a BRFplus activity is included in step 10 of the workflow process described above. This activity is used to export the department information of the employee and the instance information (InstID, TypeID, CatID) of the corresponding leave request object into the BRFplus application.

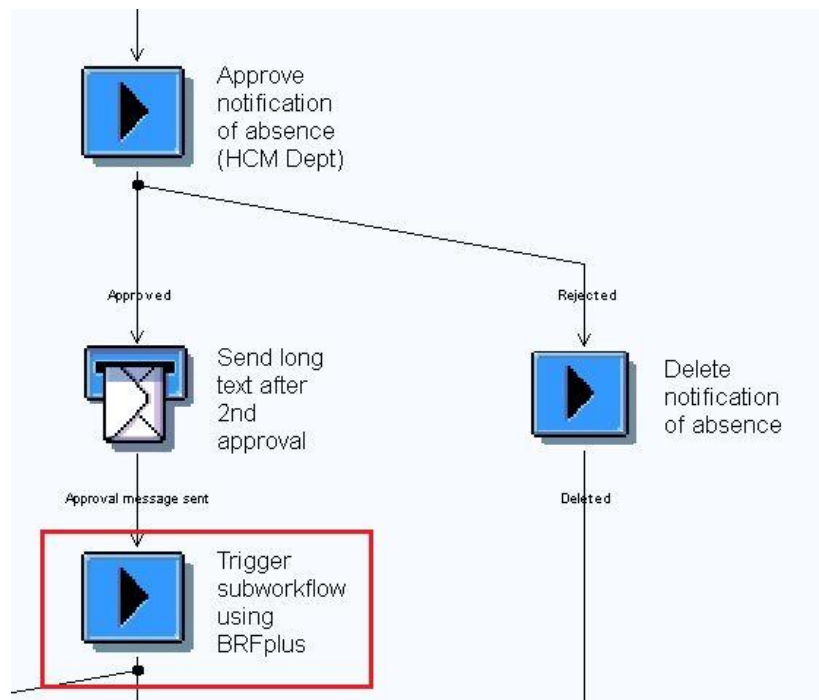


Figure 20: BRFplus activity "Trigger subworkflow" within the workflow logic

The following workflow container elements are imported into and exported from the BRFplus application:

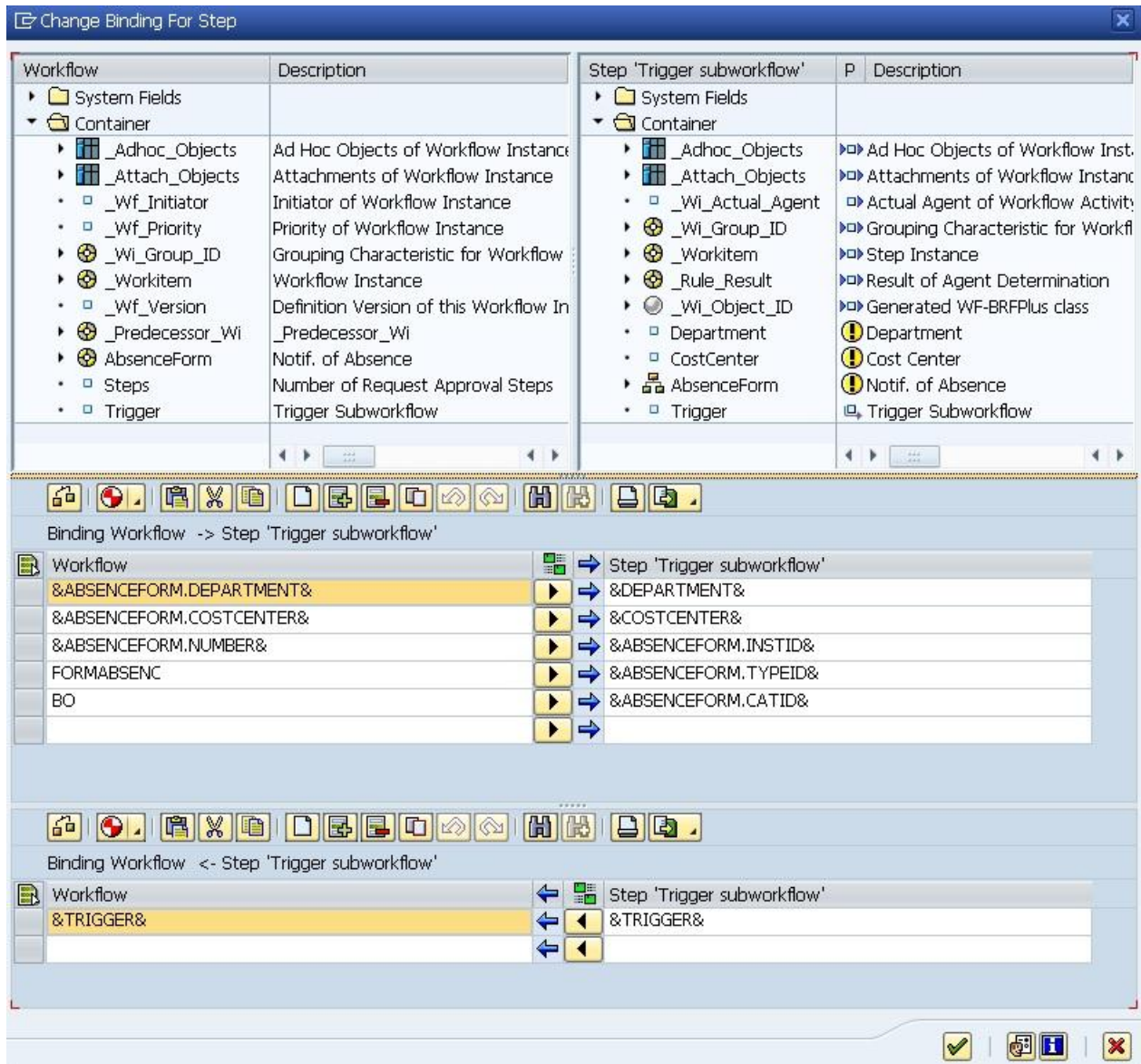


Figure 21: Data binding for BRFplus activity "Trigger subworkflow"

Within the BRFplus application, a custom Start Workflow action "Trigger subworkflow" is defined where the ID and the needed interface data of the second workflow (hiring information for manager) is defined.

**Start Workflow (Act) Trigger subworkflow** Change Mode ☒ Active

Back Display Check Save Activate Mark As Obsolete Delete

**General**

Name: WF\_BRF\_ACT\_TRIGGER\_SWF Short Text: Trigger subworkflow

Application: WF\_AP\_S\_20101206124754 Access Level: Application

Show More

**Action** Followup Actions

**Detail**

**Basic Data**

Workflow ID: WS55700009 Hiring information for manager

Delay: 0 days, 0 hours, 0 minutes, 0 seconds

**Container**

Update Workflow Container

Element	Short Text	Mandatory	Multiline	Object Type	ABAP / DDIC Object Name	Data Object Name	Data Source	Data Input
ABSENCEFORM	Notif. of Absence	<input type="checkbox"/>	<input type="checkbox"/>	BOR Object Type	FORMABSENC	FDI_S_BO_FORMABSENC	Parameter	Local Persistent Object Reference - BOR Compatible (g)
EXPRESS	Express	<input type="checkbox"/>	<input type="checkbox"/>	Element	SOS04-L_SEX	FDI_E_SOS04_L_SEX	Direct Input	X
_ATTACH_OBJECTS	Attachments of Workflow Instance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	BOR Object Type	SOFM	FDI_T_BO_SOFM	Parameter	...
_WF_PRIORITY	Priority of Workflow Instance	<input type="checkbox"/>	<input type="checkbox"/>	Element	SWFCN_TYPE_PRIORITY	FDI_E_SWFCN_TYPE_PRIORITY	Direct Input	5

Figure 22: BRFplus starts workflow activity "Trigger subworkflow"

In the custom decision table "Trigger subworkflow", this action is triggered if the employee is working in the financials department.

**Decision Table Trigger subworkflow** Change Mode ☒ Active

Back Display Check Save Activate Mark As Obsolete Delete

**General**

Name: WF\_BRF\_DT\_TRIGGER\_SWF Short Text: Trigger subworkflow

Application: WF\_AP\_S\_20101206124754 Access Level: Application

Show More

**Detail**

Insert New Row Edit Row Remove Row Copy Row Insert Copied Row Move Up Move Down Rearrange Export To Excel Import From Excel Table Settings

**Table Contents**

Department	Trigger	Actions
Financials	true	Trigger subworkflow
...	false	...

Figure 23: BRFplus decision table "Trigger subworkflow"

□ □ □

## Related Content

- Thomas Albrecht, Carsten Ziegler, *BRFplus – Business Rule Management for ABAP Applications*, SAP Press, <http://www.sdn.sap.com/irj/scn/weblogs?blog=/pub/wlg/22373>
- Carsten Ziegler, *How to Create Formula Functions*, <http://www.sdn.sap.com/irj/sgn/go/portal/prtroot/docs/library/uuid/10e9c96f-0c8b-2b10-6885-f00adbeb314b>
- Tibor Molnár, Christian Auth, *How to trigger SAP Business Workflows out of BRFplus*, <http://www.sdn.sap.com/irj/scn/go/portal/prtroot/docs/library/uuid/005960a2-9018-2d10-3ead-f984bb331b3f>
- Sudhir Sangani Rao, Sreekanth Marella Reddy, *Using BRFplus with Third-Party Rules Engine*, <https://www.sdn.sap.com/irj/scn/go/portal/prtroot/docs/library/uuid/f0b66eba-0a8b-2b10-23a8-f47907feb517>
- Rajagopalan Narayanan, *Business Rules and Software Requirements*, <https://www.sdn.sap.com/irj/sgn/go/portal/prtroot/docs/library/uuid/70c669d8-3ac2-2a10-0e96-c7c3786168f0>
- Rajagopalan Narayanan, *Five Reasons to Build Agile Systems Using Business Rules Management Functionality*, <https://www.sdn.sap.com/irj/sgn/go/portal/prtroot/docs/library/uuid/504486eb-43c2-2a10-f5a7-e84ef3fd45be>
- Online Help: [http://help.sap.com/saphelp\\_nw70ehp1/helpdata/en/cc/85414842c8470bb19b53038c4b5259/frameset.htm](http://help.sap.com/saphelp_nw70ehp1/helpdata/en/cc/85414842c8470bb19b53038c4b5259/frameset.htm)

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