SAP Business Workflow and Business Rules Framework Plus - BRFplus

Thomas Kosog
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Session 0801
May 14, 2012
Agenda - SAP Business Workflow and BRFplus

- Overview of an example material master process
- Overview of BRFplus (recommended release level: NW 7.02 SP 11)
- BRFplus in Detail
  - Function, Ruleset, Rule, Expression, Action
- ABAP program to start the process
- Business Object Type
- Event Queue
- Steps in the SAP Business Workflow
- BOR method with BRFplus function call
- Generated BRFplus Task with generated ABAP Object Class
- Summary
Example for a Material Master Workflow and BRF plus

ABAP program to call BRF plus function “Check Material”
- Select materials from data base using field MARA-BISMT and MARA_MTART
- Loop over result and filter via Material Class and Material Type in Decision Table
- Trigger Business Object Event BUS1001006 – Started_By_BRFplus

Workflow WS97300254

Workflow Container
- Material-Number
- Material-Type
- Unit of Measure
- Old Material
- Industry
- Material Owners

Background Step “ZB1001006 - Get Material data and find Material Owner”
Call BRF plus function “Find Approvers” with Decision Table
(Material Type & Branch → Material Owner)

Dialog Step for Material Owner with Attachment – Display Material.
BOR method calls BRF plus function “Determine BISMT” - Decision Tree
- Present result in Pop-Up with suggested BISMT value

Background Step
Call BAPI to add BISMT to Material
- Raise temporary ERROR, if it fails

Material Owner provided value for BISMT

Generated BRFplus Task “Send Email”

Hint: Use Event Queue to avoid system overload
BRFplus Details
BRFplus Overview

BRFplus workbench:  
- Simulate Function

Input via ABAP  
Program to call a  
BRFplus function

Input via  
generated  
Web Service

Function with Signature (Input data and result)

Ruleset (One or more)

Sequential Rules  
to implement Business Logic

Context:  
Function Signature  
and additional  
Variables

After simulation:  
Look at result  
and trace in the  
BRFplus Workbench

Read

Perform Action,  
like “Send email”,  
“Start Workflow”,  
“Trigger Event”

Read

and Update

Expressions, like  
Data Base Look Up,  
Loop, Decision Table,  
Decision Tree,  
Formula

Returned Result
Transaction “BRFplus”
– Call Web Browser with BRFplus Workbench

Finishing Steps
- SAVE
- CHECK
- ACTIVATE
→ BRFplus is generating ABAP objects

Switch to EDIT mode for more functionality
Active Indicator

Right click to get menu

Called from Program to start Workflow
Called from method in Workflow dialog step
Called from method in Workflow background step
BRFplus Function

GUID used in ABAP program to call BRFplus function

Drop Down Menu

Test

Import

Export

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Simulation of a BRFplus function (Test)

Trace shows result of every step

Note: This event did not occur yet, since the step to call the ABAP statement “Commit Work” was not added to this BRFplus function yet.
BRFplus Data Element and “Where Used List “

BRFplus “Binding” points to DDIC element.
You can also define elements on BRFplus delivered types:
- Text, Amount, Boolean, Number, Quantity or Time-Point
A BRFplus function needs at least one ruleset.

Each ruleset has one or more rules.

A ruleset is using the signature of the BRFplus function and can add additional variables to the context.

Hint: Top-Down Modeling Approach – Create the next “lower” level when and where you need it
Ruleset and Rules

Click on the “number” in front of the variable to add more Context Elements. Example: “Material-List” to carry result of rule-1 into rule-2.

Rules are called sequentially.

BRFplus expression for a database select statement - Result: Material-List.

Complex rule with loop, decision table and action to trigger Workflow Event.
The Material List was created by the previous rule, which called an expression to perform a data base look up.

The Material-Group and Industry are a part of the structure Z_MATERIAL and are used in the decision table.
Action

Predefined BRFplus action for Workflow:
- Start Workflow Instance
- Trigger Object Event

Hint: It is better for the system performance not to start too many workflow instances in a short time ➔ Trigger Events and use Event Queue

Option to add values to predefined event parameters
Decision Table to Return Users

BRFplus function to find users
- Context
- Ruleset
- Rule
- Expression with decision table returning a list of users
- Check user validity and convert into Workflow Agents in following rule or calling ABAP method
Decision Tree to suggest Value for BISMT

Find BISMT Value based on
- Industry (Branch)
- Unit of Measure
- Material Type

Hint: This is only an example. This is NOT how SAP recommends to use the field MARA_BISMT.
Workflow Design
Summary Overview for the Start Process

ABAP program
- BRFplus function
  - BRFplus Rule
    - BRFplus Expression
      - BRFplus Action
        - BOR Event
          - Event Queue
            - Job to run Event Queue

Workflow
WS97300254

Workflow - Container

- Get material data and owners
- Material Owner provides BISMT value
- Update Material Master with new BISMT value

Element
- Material_Master
- Return
- Material_Owners
- Material_Type
- Industry_Sector
- Material_Group
- Old_Material_Number
- Base_Unit_Of_Measure
- Return_Messages

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Business Object Type – SW01

ZB1001006 is a sub-object type of Business Object BUS1001006 with a system-wide delegation.

Object type ZB1001006 Standard_Material

- Interfaces
- Key fields
- Attributes
- Methods

Standard_Material.Get_MAT_Data_and_Owners
Standard_Material.Decision_for_Material_Owner
Standard_Material.Store_New_BISMT_Value

Events

Standard_Material.Started_by_BRFplus

Hint: BRFplus functions can also be called in virtual attributes and functional methods.

Call BRFplus function

BAPI call

Triggered by an Action from within a BRFplus function
Example Program to Start the Process – SE38

```abap
REPORT z_brfplus_asug_demo.
DATA: lo_function TYPE REF TO IF_FDT_FUNCTION,
     lo_context TYPE REF TO IF_FDT_CONTEXT,
     lo_result TYPE REF TO IF_FDT_RESULT,
     lx_fdts TYPE REF TO CX_FDT.
FIELD-SYMBOLS:  LS_MSG TYPE IF_FDT_TYPES=>S_MESSAGE.

* get function instance
lo_function = cl_fdt_factory=>if_fdt_factory->get_instance( )->get_function(
  iv_id = '005056803CA01BE19090A3996FDC29B2' ).

* populate input parameters of BRFplus function
lo_context ?= lo_function=>get_process_context( ).
lo_context->set_value( iv_name = 'MATERIAL_TYPE' ia_value = 'FERT' ).
lo_context->set_value( iv_name = 'OLD_MATERIAL_TYPE' ia_value = 'TBD' ).

TRY. "Start BRFplus function"
  lo_function->process( EXPORTING io_context = lo_context IMPORTING eo_result = lo_result ).
  * Normally a COMMIT WORK is not necessary after the call of a BRFplus function.
  * In this case it is needed, since triggering a Workflow Event always needs a COMMIT WORK
  commit work.
  CATCH CFX_FDT INTO lx_fdts.
  LOOP AT lx_fdts->mt_message ASSIGNING LS_MSG.
    WRITE: / LS_MSG->text.
  ENDFUNCTION.
```

Hint: Set a breakpoint and run the program to see the ABAP code, which was generated by BRFplus

Each BRFplus function has its own unique GUID
BOR Method calling a BRFplus function

```java
45  data: lo_factory type ref to if_fdt_factory,
46      lo_my_function type ref to if_fdt_function.
47  * get function instance
48  call method cl_fdt_factory=>if_fdt_factory-get_instance
49     receiving ro_factory = lo_factory.
50  lo_my_function = lo_factory->get_function()
51  iv_id = '005056803CA01EE192D3258AA8F3C9B2'.
52  * populate input parameters
53  lo_context ?= lo_my_function->get_process_context().
54  lo_context->set_value( iv_name = 'MATERIAL_TYPE'
55     ia_value = material_type ).
56  lo_context->set_value( iv_name = 'MBRSH'
57     ia_value = industry_sector ).
58  * invoke the ruleset
59  try.
60  lo_my_function->process( exporting io_context = lo_context
61     importing eo_result = lo_result ).
62  lo_result->get_value( importing ea_value = lt_users ).
```

GUID of the BRFplus function to find Material Owners

This BRFplus function provides a result. These users need to be checked and changed into Workflow Agents.

If no workflow agent could be determined, then an exception handler could be added, a Workflow error could be raised or the workitem could be routed to all possible agents of the dialog step.
Event Trace - SWEL

If the BRFplus function was only simulated, then this list is empty.

This snapshot was taken, after the Start Program was called.

<table>
<thead>
<tr>
<th>Object Type</th>
<th>Event</th>
<th>Current Date</th>
<th>Time</th>
<th>Name of Receiver Type</th>
<th>Information</th>
<th>Handler/Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS1001006</td>
<td>STARTED_BY_BRFPLUS</td>
<td>02-12-2012</td>
<td>14:40:31</td>
<td>WS97300254</td>
<td></td>
<td>Event put in queue</td>
</tr>
<tr>
<td>BUS1001006</td>
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<td>14:40:32</td>
<td>WS97300254</td>
<td></td>
<td>Event put in queue</td>
</tr>
</tbody>
</table>

Event Data
- Event Instance ID: 1726090
- Object Type: BUS1001006
- Object Key: A0002
- Event: STARTED_BY_BRFPLUS

Trace Data
- Trace Date/Time: 02-12-2012 14:40:32 CST
- User Name: THOMAS KOSOG
- Main Program: Z_BRFPLUS_ASUG_DEMO
- Action: Event entered in event queue

This snapshot was taken after the “event-queue” job was started.

<table>
<thead>
<tr>
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<tr>
<td>BUS1001006</td>
<td>STARTED_BY_BRFPLUS</td>
<td>02-12-2012</td>
<td>14:41:04</td>
<td>WS97300254</td>
<td></td>
<td>Event put in queue</td>
</tr>
<tr>
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<td>STARTED_BY_BRFPLUS</td>
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</tr>
</tbody>
</table>
Event Type Linkage - SWETYPV

Similar to the ‘Workflow event activation’, this configuration for using the Event Queue needs to be transported to the QA or productive system.
Background job for processing the event queue
The event queue is read by a background job at regular intervals. The events found are delivered to the registered event receivers.
Configuration setting on each system:
- Schedule background job
- Define operating mode
Specify the events per read access, which are to be processed via the event queue.
Specify the time interval between two read accesses, if there are events in the queue.
Specify the time interval before the event queue is next checked.
This time interval is adhered to if there are no more events after the queue is read.

Hint:
Start with the SAP default setting for “Events per minute” and then increase this number by 50% once (or twice) and test max. throughput of tRFC
Simple Example for a Dialog Workitem with Result of BRFplus Decision Tree

Workflow 3

Provide BISMT value for Material A0001

Description
First open the attached material and then launch this workitem

Objects and attachments
- Standard material: Nail

Suggested value for MARA-BISMT

New BISMT value for Material A0001

Accept or Overwrite this value
Name: Goods

Display Material A0001 (Finished product)

General data
- Base Unit of Measure: KG
- Old material number: TBD
BRFplus Button in the Workflow Builder

1. CONTINUE creates a Task with BRFplus button

2. Manually copy GUID of BRFplus Function

3. CONTINUE

4. Generated Task

5. Click on BRFplus button to open Workbench
BRFplus Workflow Task with
Generated Binding and Generated ABAP Object Class

Parameters of BRFplus function must be based on DDIC elements

BRFplus function with decision table and send email action

Look at class with transaction SE24 to see how the Method reads task container and calls BRFplus function with import and export parameters.
Summary “End To End” Process

ABAP Program calling BRFplus function “Check Material” to trigger Business Object Events

Event Queue will spread out Workflow starts

Business Object Method to collect data for Workflow Container and to call BRFplus function “Find Owners”. Method will also check user and convert them to Workflow Agents.

Online transaction calling BRFplus function “Determine BISMT”

Generated Task based on generated ABAP Object Class to call BRFplus function “Send Email”
## Summary - BRFplus Terminology compared to Workflow

<table>
<thead>
<tr>
<th>BRFplus</th>
<th>SAP Business Workflow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>Workflow template</td>
</tr>
<tr>
<td>Simulate with trace</td>
<td>Test Workflow and look Workflow Log</td>
</tr>
<tr>
<td>ABAP procedure to call BRFplus function</td>
<td>ABAP program to start Workflow instance</td>
</tr>
<tr>
<td>Import parameters in function signature</td>
<td>Workflow container elements with import flag</td>
</tr>
<tr>
<td>Ruleset (Each function needs at least one ruleset)</td>
<td>Workflow Builder for Main Workflow or Sub-Workflow</td>
</tr>
<tr>
<td>Context (for each ruleset) - Click on “Number” to add Variables</td>
<td>Manually add elements to the Workflow container at design-time</td>
</tr>
<tr>
<td>Rule - Ruleset calls one or more rules in sequence</td>
<td>Workflow Step of the type ‘Activity’ - Standard Task</td>
</tr>
<tr>
<td>Condition to perform rules - based on variables in context</td>
<td>Condition in the process flow to bypass a step</td>
</tr>
<tr>
<td>Expression (One rule can call many expressions) - Import parameters from context - Result changes a variable in context</td>
<td>Standard Task calls method of Business Object or ABAP Object - Binding to Workflow Container via Task Container</td>
</tr>
<tr>
<td>Action - Import parameters from context - Result has no impact on context</td>
<td>Asynchronous procedure called by Workflow. Examples: “Send Email”, “Start Workflow” or “Trigger Event”</td>
</tr>
</tbody>
</table>
Thank You!

Contact information:

Thomas Kosog
Principal Workflow Consultant
SAP Chicago