

A Practical Guide to Teamcenter Engineering Workflow Designer

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Premium Partners:



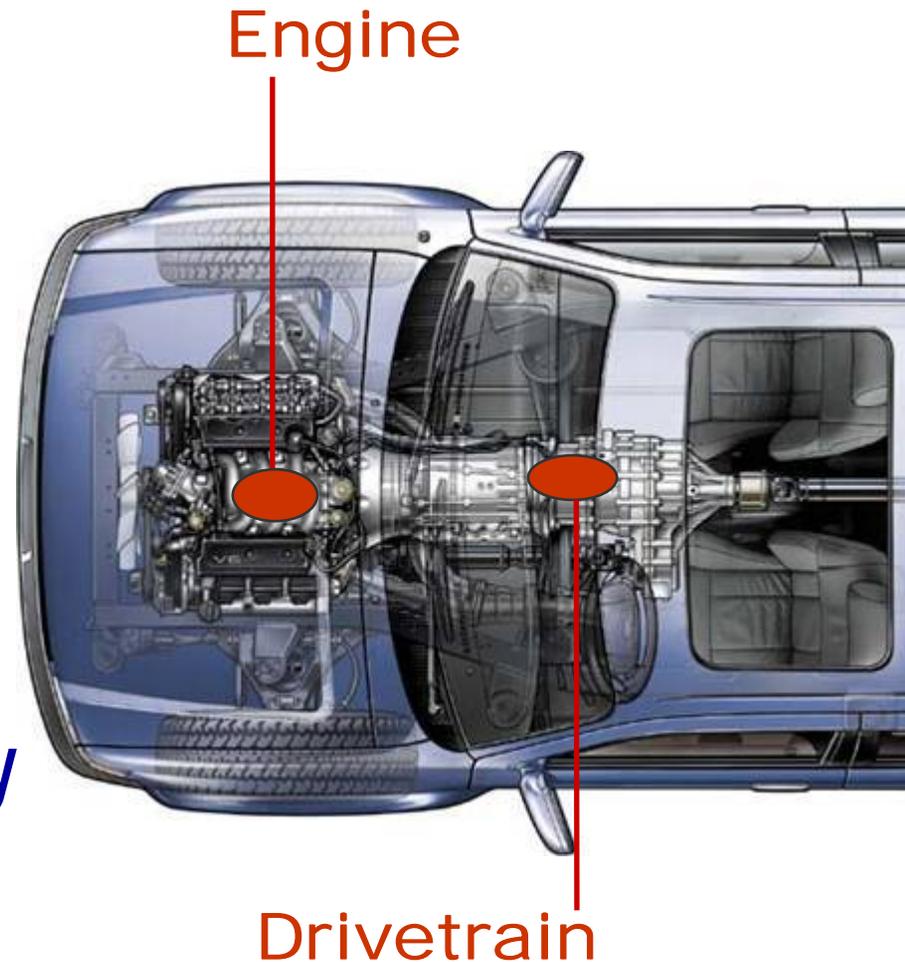
Microsoft

What we will cover...

- Who we are
 - BorgWarner Morse TEC that is...
- Tips and techniques with Workflow Designer
- Practical examples
 - What the end user sees when setting certain Rule Handlers.
- Limitations of the out-of-the-box handlers
- Home grown handlers

BorgWarner - We Are Powertrain Focused

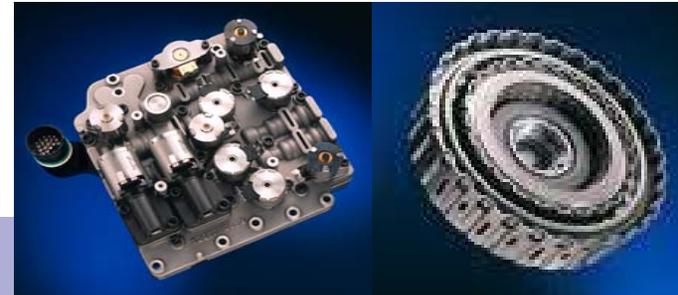
- Sales \$4.3 Billion
- Employees 17,300
- Operations 62 Locations
17 Countries
- Products Powertrain
Systems
- Drivers Fuel Economy
Performance
Air Quality
Vehicle Stability



Company Profile - Drivetrain

Drivetrain Group

DualTronic® Clutch Module
Solenoids / Control Modules
Transmission Systems
Transmission Bands
One-way Clutches
Friction Plates



4WD Transfer Cases
AWD Systems
TorqTransfer Systems
Synchronizer Rings
Electronic Control Units



Company Profile - Engine

Engine Group

Cars
Trucks (Light, Medium, Heavy Duty)
Off Highway

Turbochargers



Emission Controls
Secondary Air Systems
Actuators

Emission Systems



Engine Timing Chain
Variable Cam Timing
Gemini™ Chain Systems
HY-VO® Transmission Chain
Oil Pumps / Drives

Chain Systems



Thermal Management Components
and Systems

Visctronic® Systems
Fans / Fan Drives

Thermal Systems



Diesel Cold Start Technology
Electronic & Sensor Technology
Gas Ignition Technology

Beru Technologies



Workflow Definition

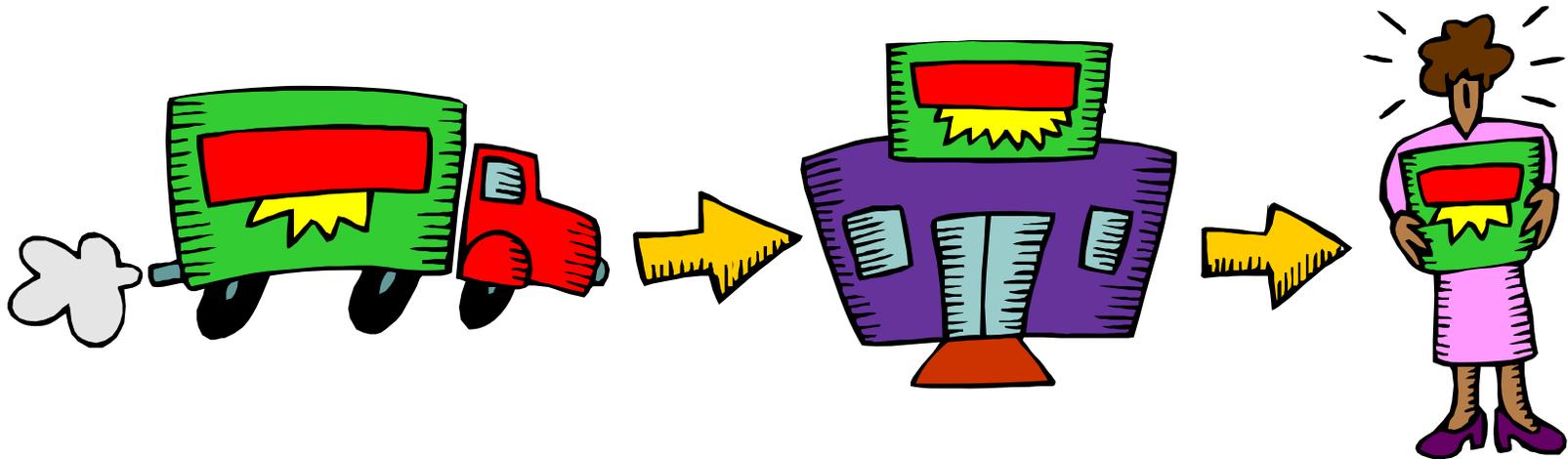
From the **Workflow Management Coalition**:

The automation of a business process, in whole or part, during which documents, information or tasks are passed from one participant to another for action, according to a set of procedural rules.

<http://www.wfmc.org/>

TcEng is Workflow !

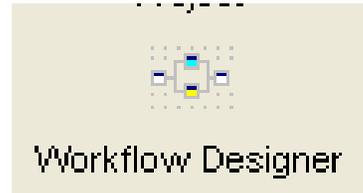
So according to that definition TcEng Workflow is a workflow system !!!!



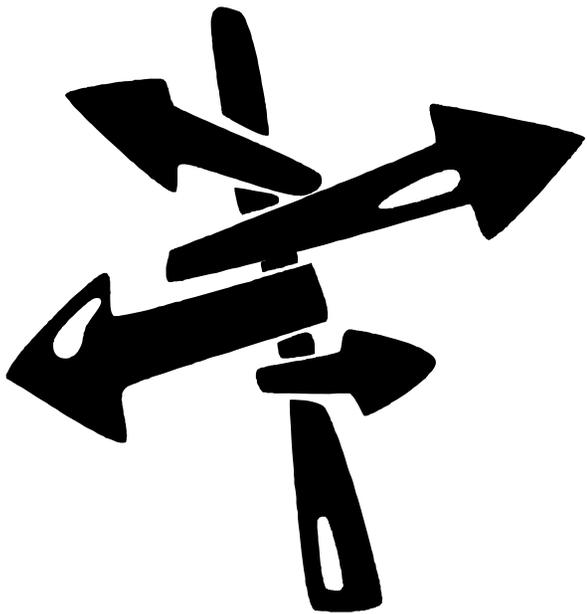
Despite what some people say about “business” processes not belonging in a PDM system !

How do I get there.....

First go to Admin Applications
Then go to Workflow Designer



Select the process
And then hit the edit button...



But before we go...

Limit the number of process template choices to prevent the user from selecting the wrong process.

New Process Dialog

Process Name: 9998888/A-ifhzfdhzidhf *

Description:

Process Template: Add Status Assign Effectivity

Show Under Construction Templates Process Template Filter: All Assigned

Attachments | Process Template

Task Attachments

- Targets
 - 9998888/A-ifhzfdhzidhf *
- References

New Process Dialog

Process Name: 9998888/A-ifhzfdhzidhf *

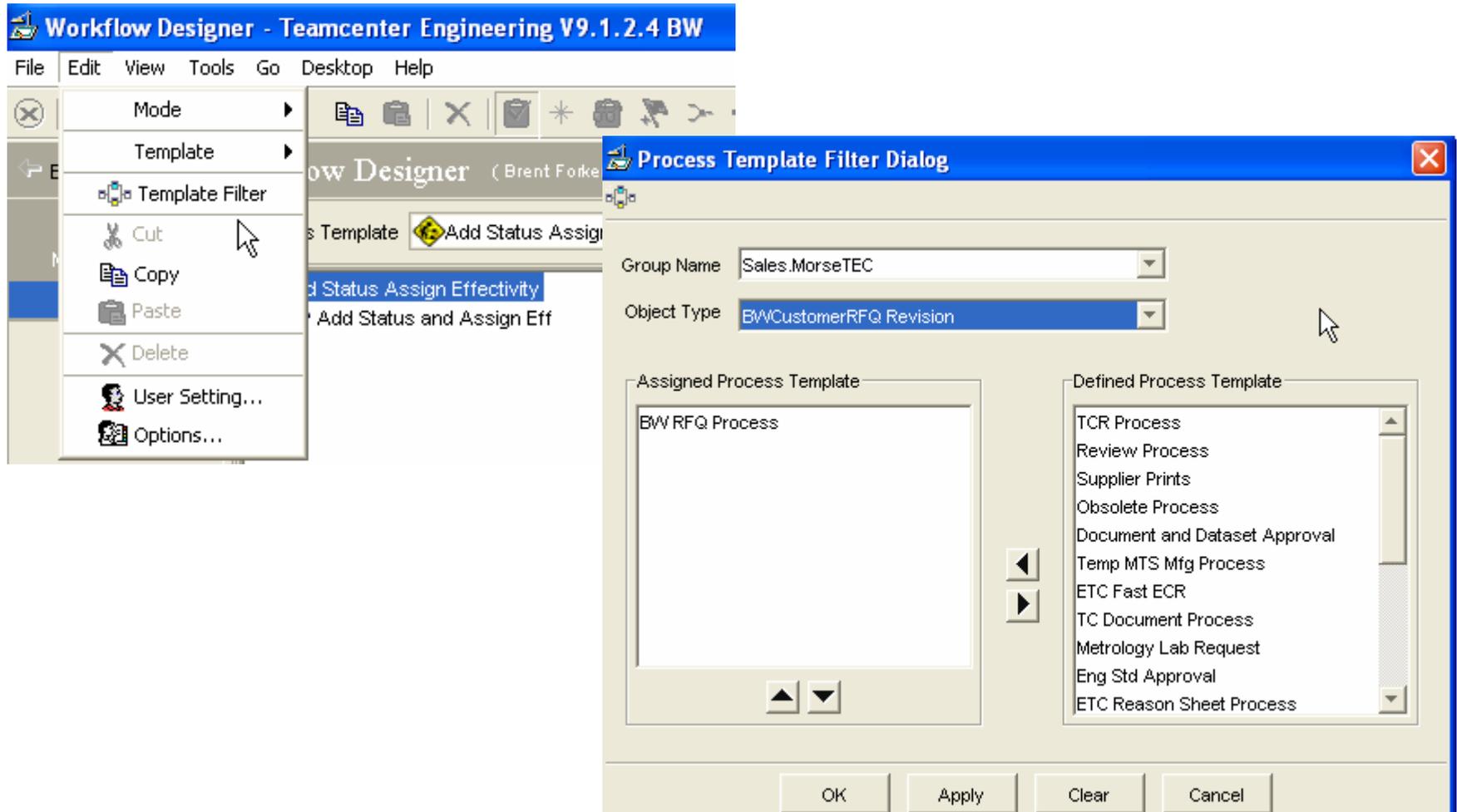
Description:

Process Template: Global R1 Drawing Release

Show Under Construction Templates

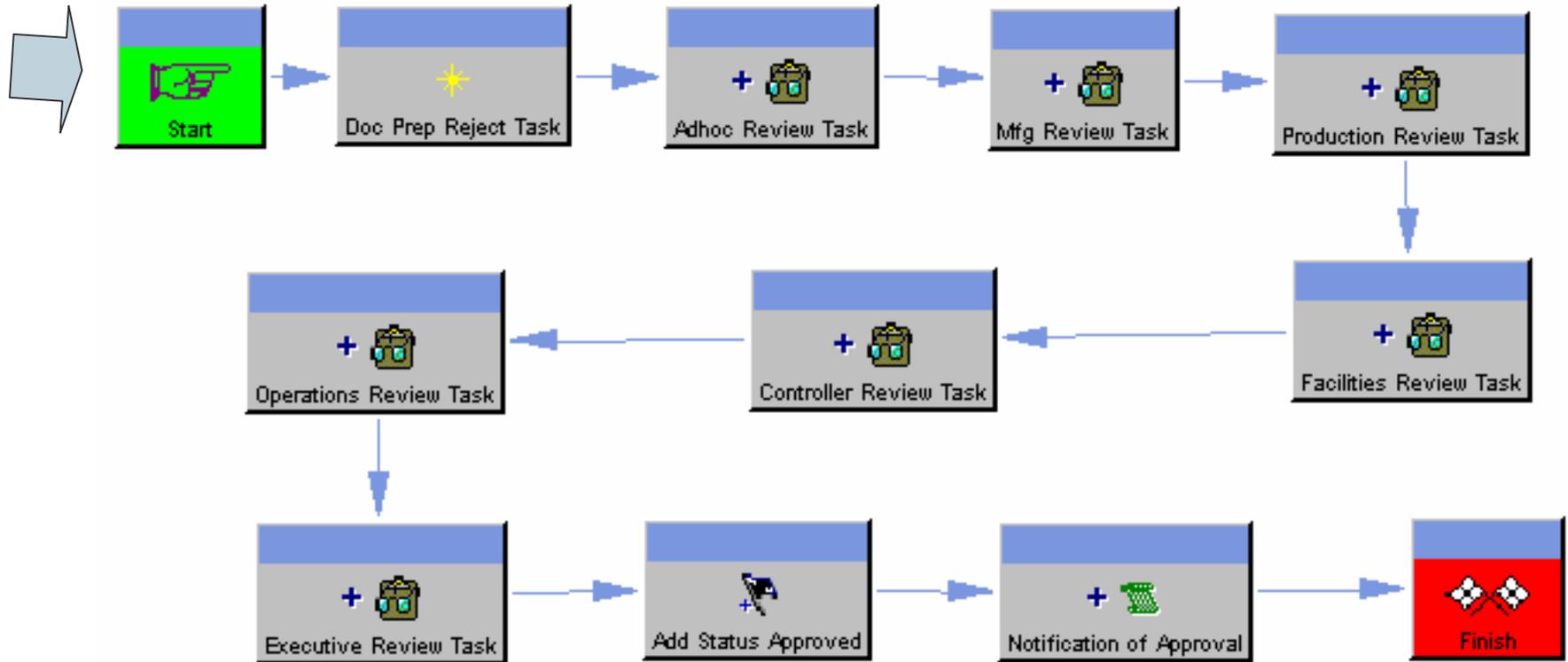
But before we go...

You find the Template Filter command in Workflow Designer, under Edit:



Starting Simply...

Implement rule handlers here to prevent the user from selecting the wrong objects from entering the workflow.



Starting Control...

Handlers

Global R1 Drawing Release

- Assign
- Start
 - Rule - Quorum
 - EPM-validate-target-objects**
 - EPM-attach-related-objects
 - EPM-attach-related-objects
 - CR-assign-team-selector
 - auto-assign-rest
- Perform
- Complete
- Skip
- Suspend
- Resume
- Abort
- Undo

Handler Type: Quorum: -1

Task Action: Start

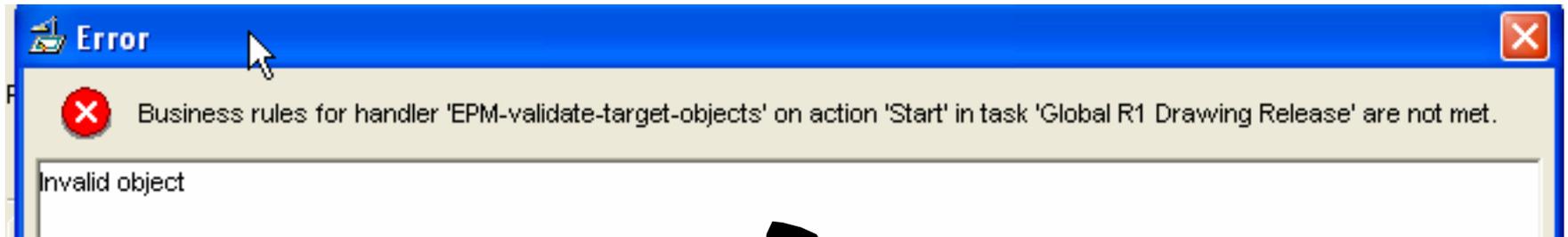
Rule Handler: EPM-validate-target-objects

Argument	Value(s)
-allowed_type	BWPart Revision,Image,DirectModel,UCR

+ - ?

Starting User Message...

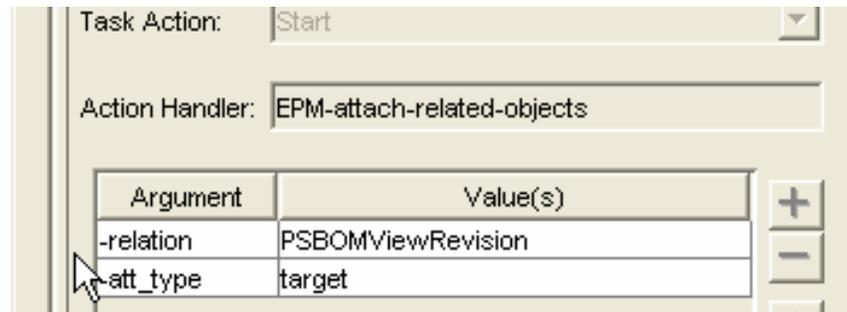
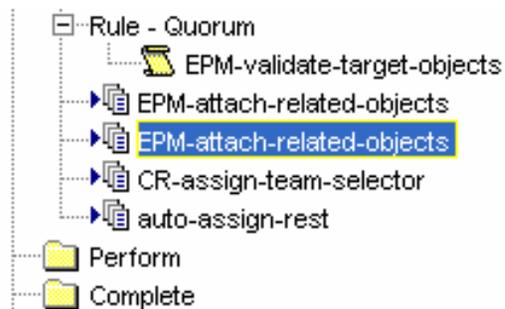
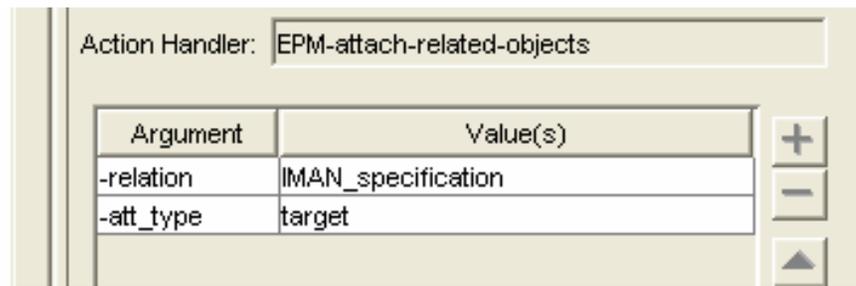
Here is what the user will see if the wrong type is selected as target:



UGS Note: Would be nice if it showed what were the valid types at this point.

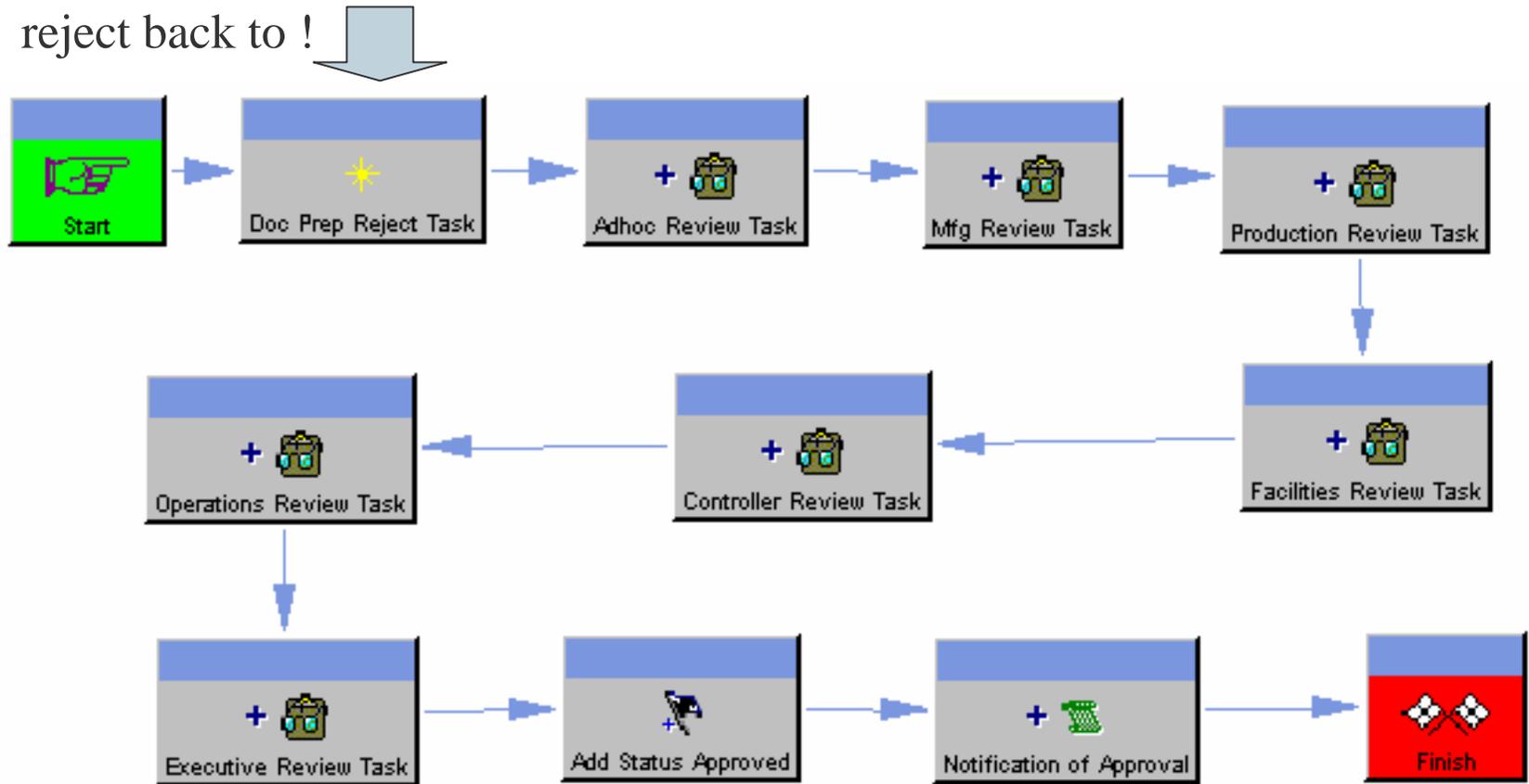
Starting Additionally...

Implement action handlers that auto add the specification and BOM Views if so desired. Makes it so the user only has to select the Item Revision as the target and everything is added “automagically”.



Ta Da To Do...

Do Task at the start of a process to double check accuracy (non value added task the first time through) but more importantly to have some place to reject back to !



UGS Note: Would be nice if any task could be skipped the first time through.

To Do – What the User sees

Properties Viewer Referencers Display Data

Task View Process View

Task Name: Internal Review

Task Instructions: The originator is to obtain working level cross-functional sign-off.

Done:

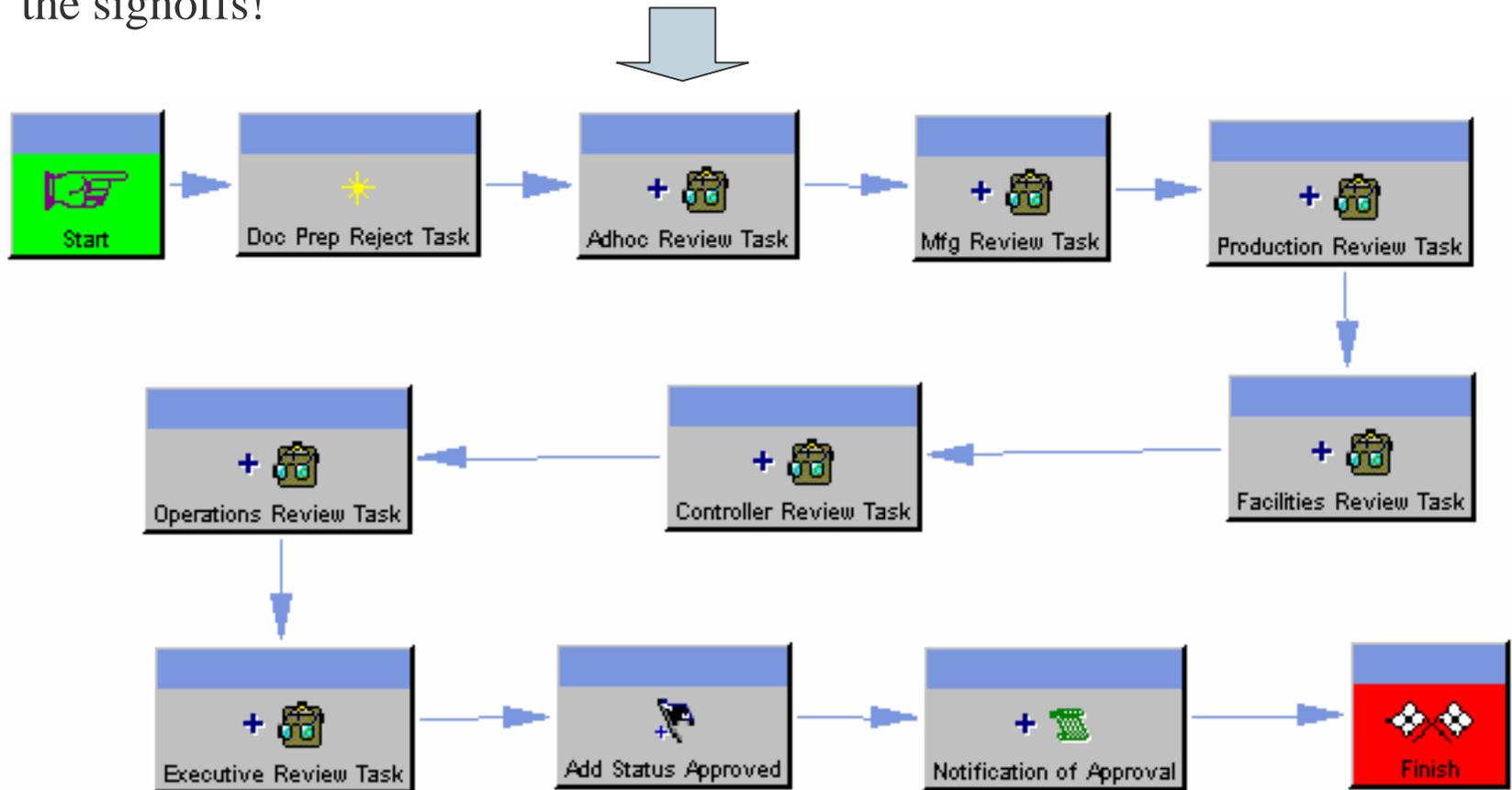
Apply

Nice place showing instructions, but you can't type that much in the Workflow Designer application instruction window (would be nice).

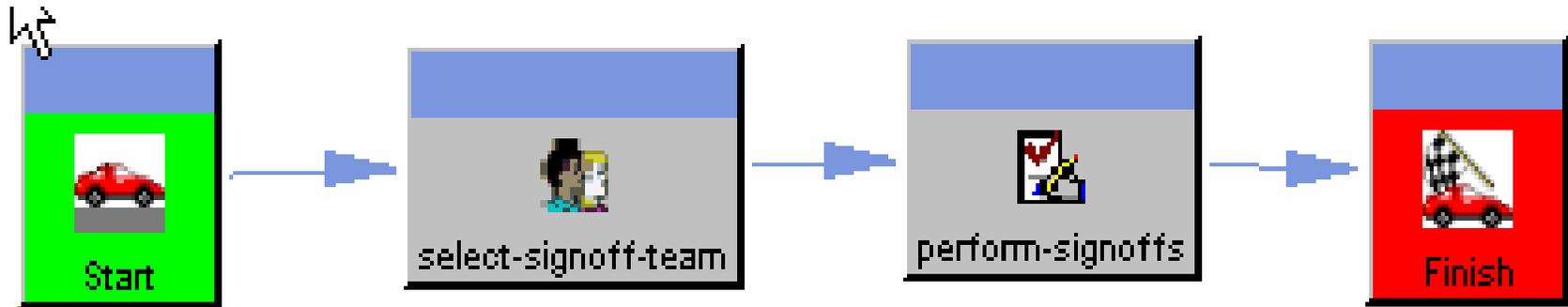
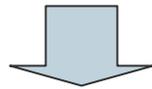
UGS Note: Would be nice if this space conformed to amount of text, allow more text and graphics.

The Review Task...

Adhoc Review task which means that someone must pick the users to do the signoffs!



Selecting the reviewers...



- Start
 - inherit
 - adhoc-signoffs
 - set-duration
 - late-notification
- Perform
- Complete
- Skip

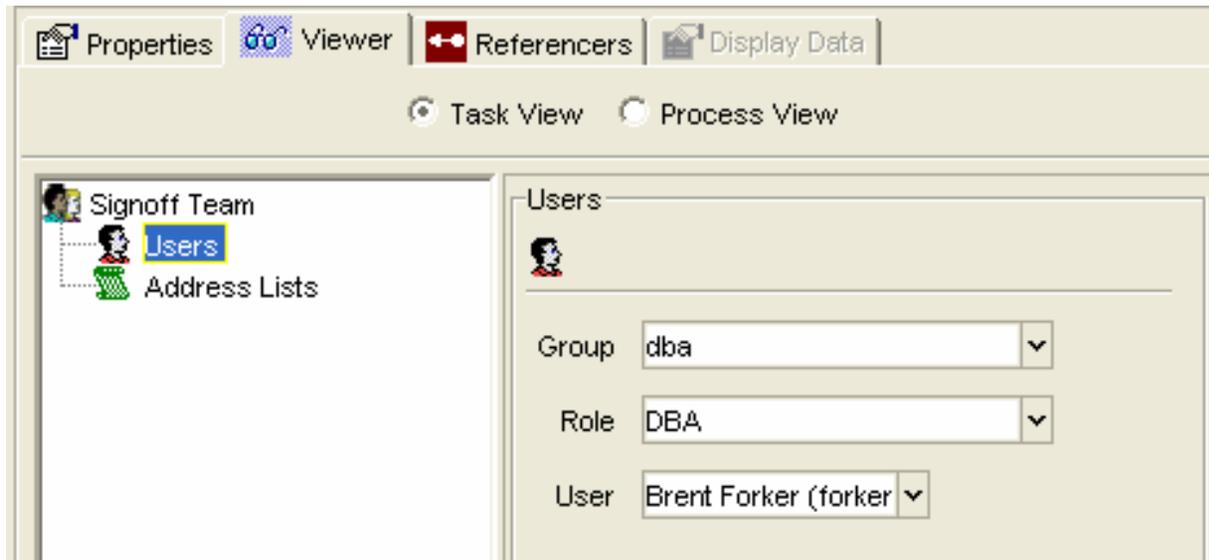
Task Action:

Action Handler:

Argument	Value(s)

+
-

Selection is fun...



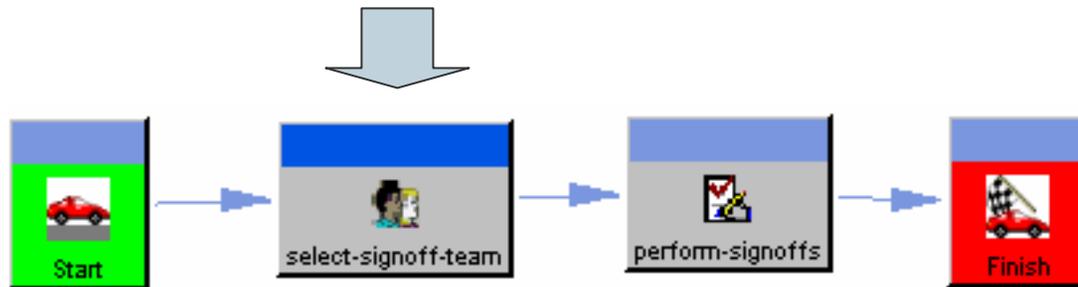
Works great if you are in the same group as the user you want to select.
Works OK if you know what group/role the user you want is in .
Doesn't work at all if you don't know where they are !

UGS Note: Would be nice if there were easier ways to select adhoc signoff team members. (Reported fixed in 9.1.3.1 ☹)

Could you just allow the organization application to be open with this dialog? Or cascade down a group hierarchy?

Auto Selection for one...

Auto assigned Review task to one person (this is much easier to take than adhoc for the end users).



Handlers

- select-signoff-team
 - Assign
 - Start
 - inherit
 - adhoc-signoffs
 - Perform
 - Complete
 - Skip
 - Suspend
 - Resume
 - Abort

Handler Type: [Icon] [Icon]

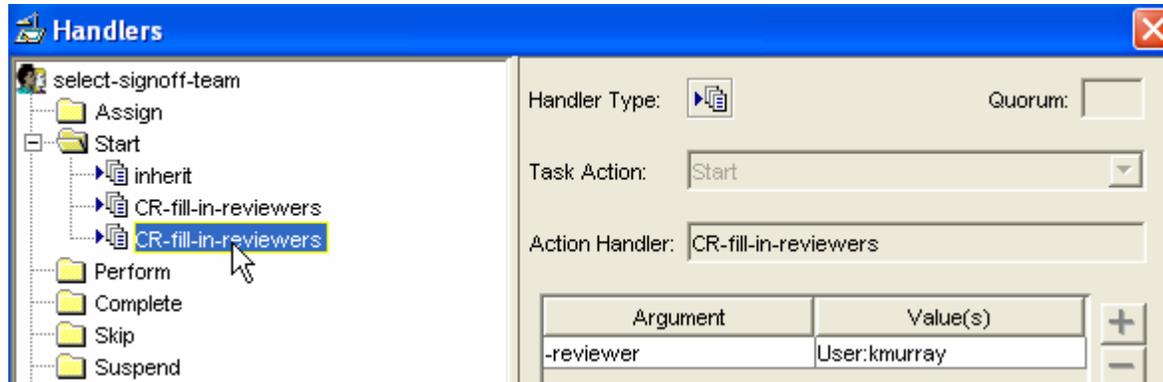
Task Action: Start

Action Handler: adhoc-signoffs

Argument	V
sracher	
AUTO_COMPLETE	

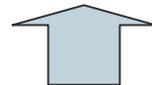
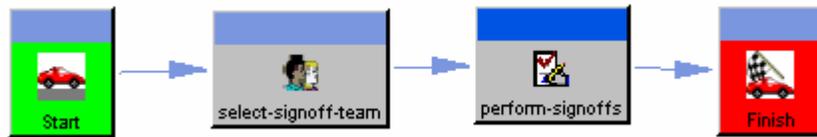
Auto Selection for many...

Auto assigned Review task to more than one person and auto completed.



UGS Note: Make the argument –reviewer accept more than one user at a time.

Forcing Comments!



Handlers

- perform-signoffs
 - Assign
 - Start
 - inherit
 - Perform
 - EPM-check-signoff-comments**
 - Complete

Handler Type: Quorum:

Task Action: Perform

Action Handler: EPM-check-signoff-comments

Signoff Decision

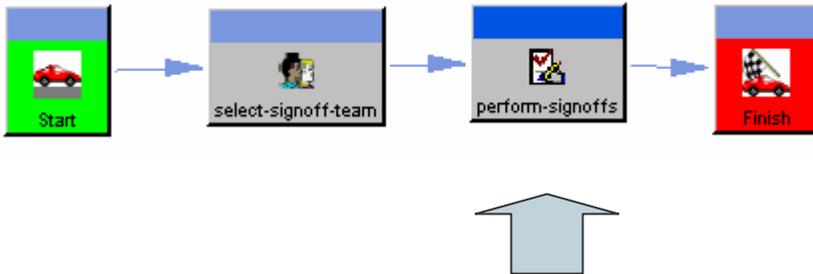
Decision:

- Approve
- Reject
- No Decision

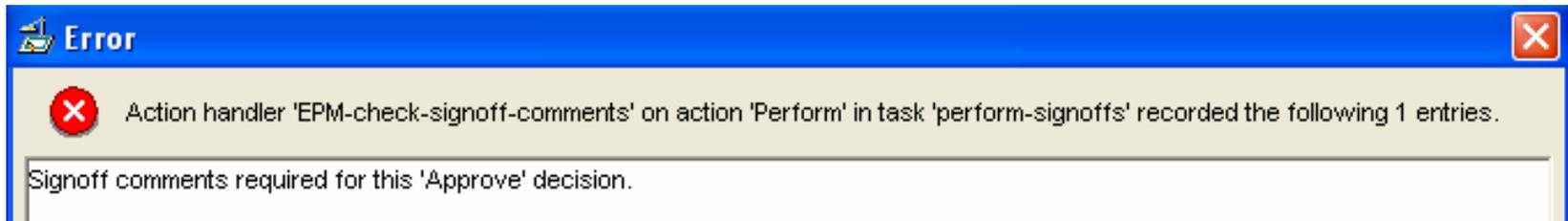
Comments:

OK Cancel

Forcing Comments!

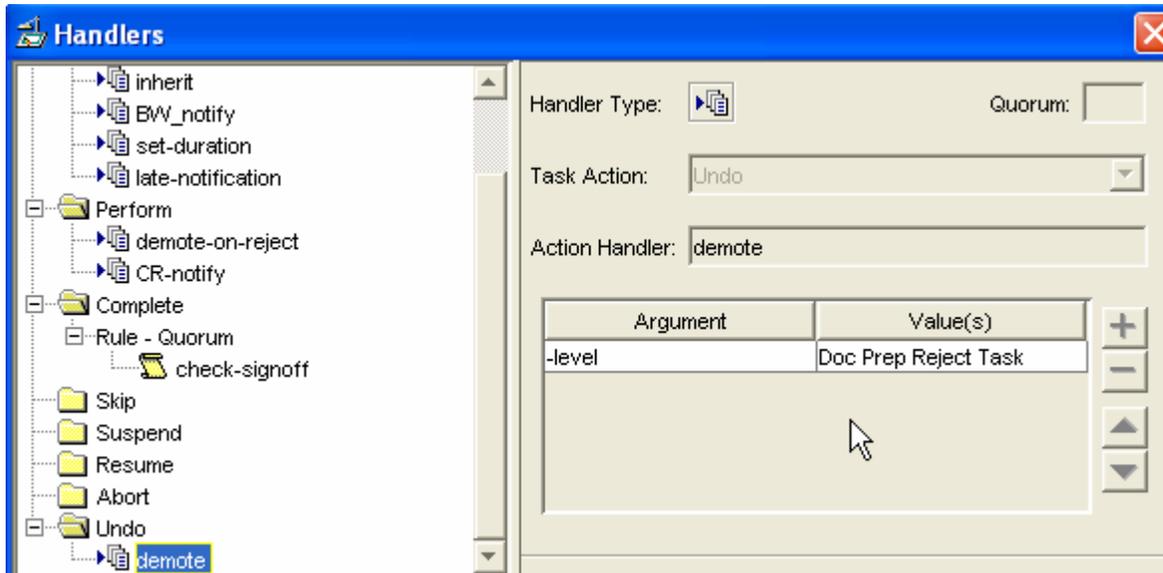
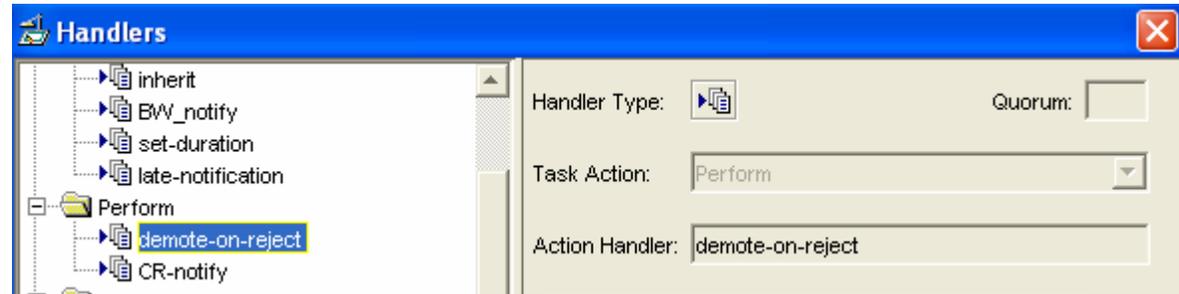
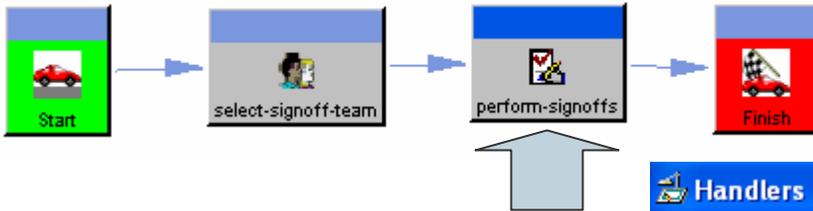


If the user does not enter some text then he gets this:



UGS Note: Excellent ! 😊

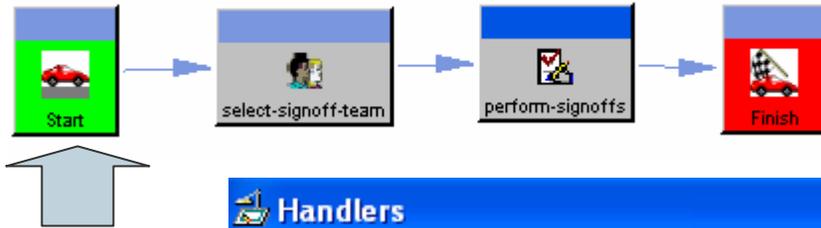
Rejection!



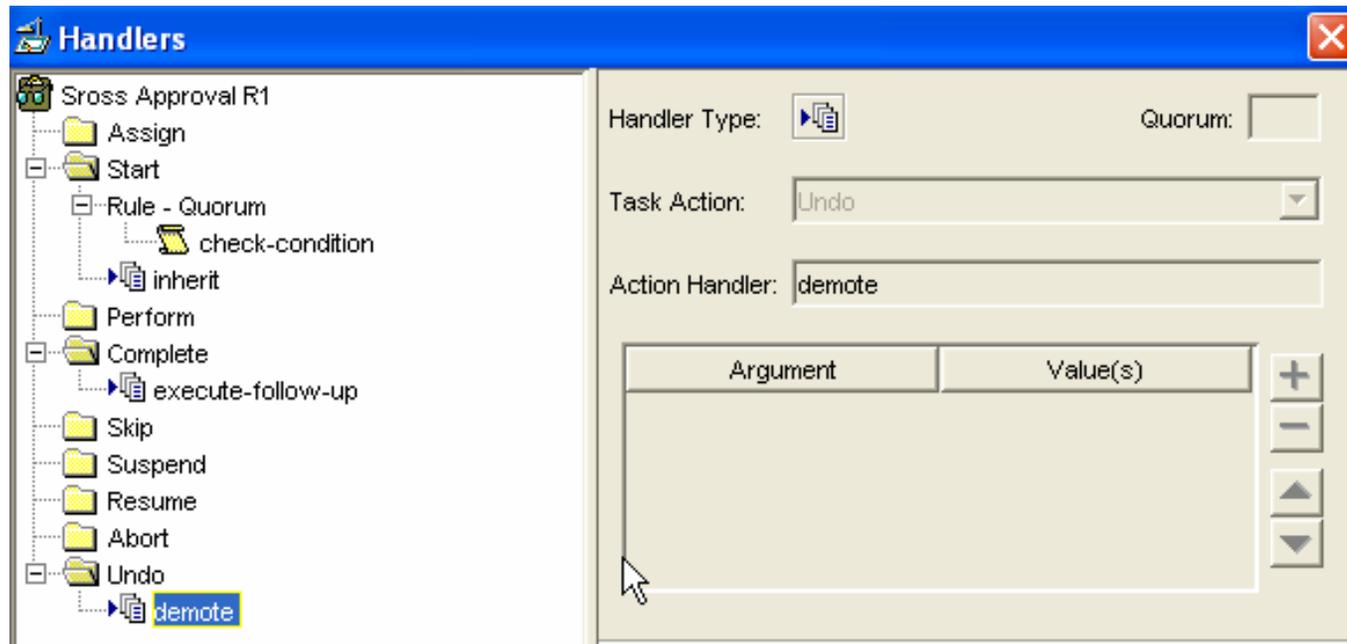
Caveats:

1. Cannot reject past a decision task in 9.1.2.4. (fixed 9.1.2.10)
2. Cannot reject out of sub task in 9.1.2.4. (Fixed in 9.1.2.10?)

Rejection!

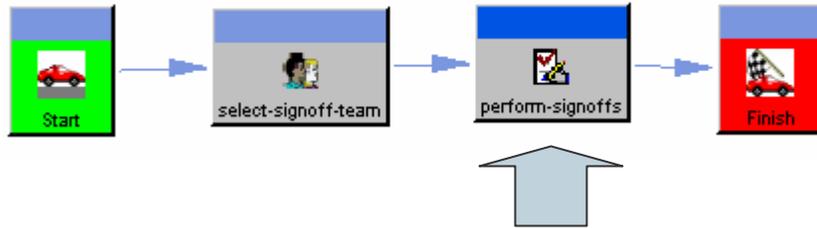


Demote at the undo of the top level review task needs to be removed.

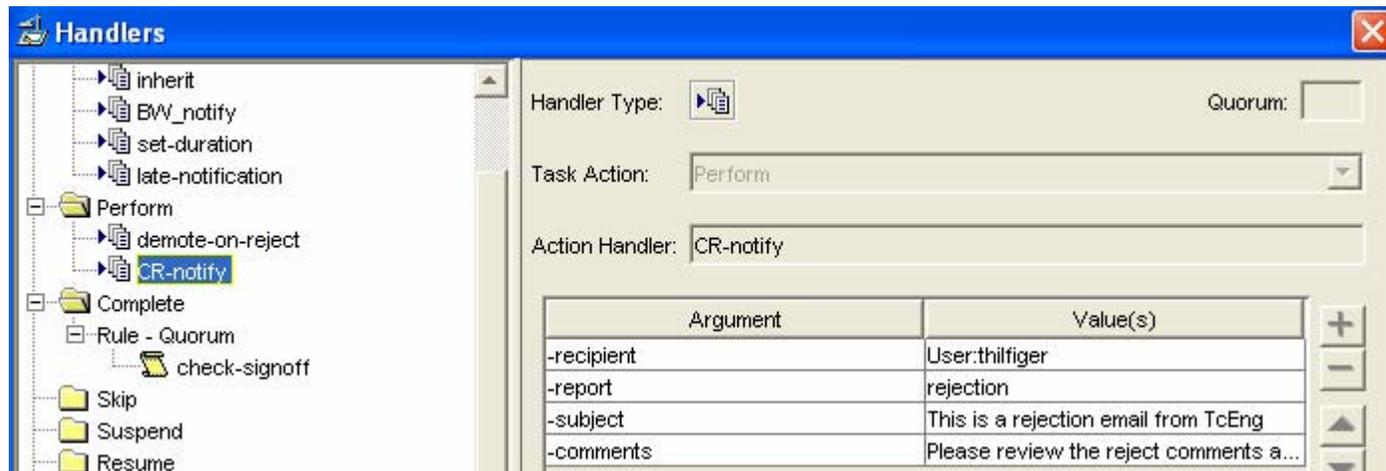


UGS Note: Can you fix this?

Rejection Notify !



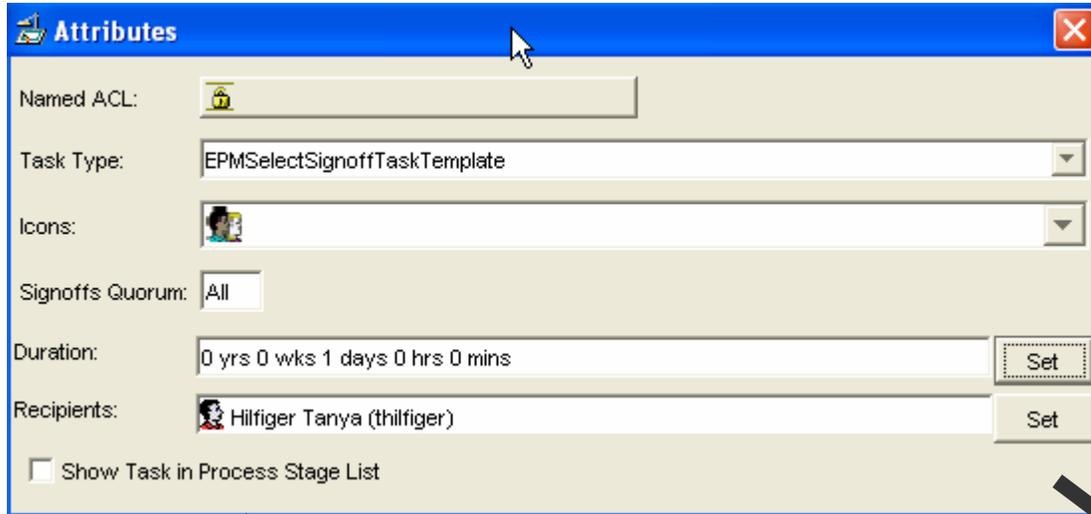
Obviously its nice to be able to send a rejection email to someone if his job is rejected.



UGS Note: Can you remove from the help documentation:

“Do not use this value unless you want the process to always send a rejection notice.”

Adding Late Notifications...



Attributes

Named ACL:

Task Type: EPMSelctSignoffTaskTemplate

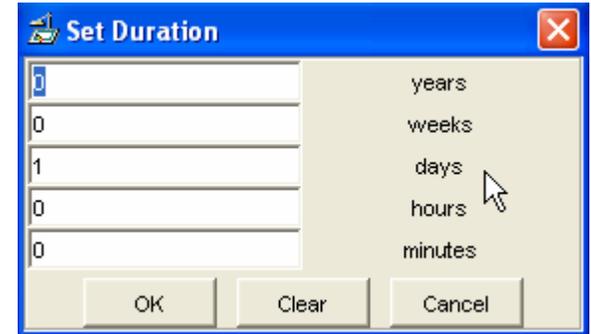
Icons:

Signoffs Quorum: All

Duration: 0 yrs 0 wks 1 days 0 hrs 0 mins

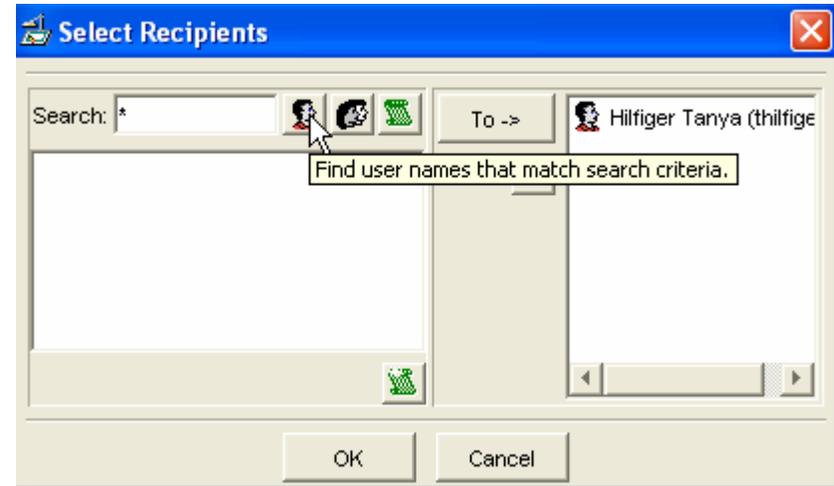
Recipients:

Show Task in Process Stage List



Set Duration

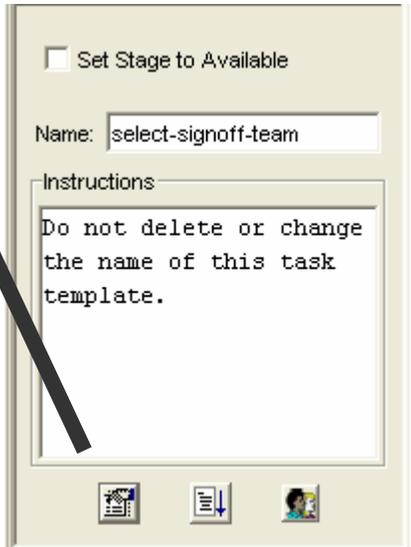
<input type="text" value="0"/>	years
<input type="text" value="0"/>	weeks
<input type="text" value="1"/>	days
<input type="text" value="0"/>	hours
<input type="text" value="0"/>	minutes



Select Recipients

Search: *

Find user names that match search criteria.



Set Stage to Available

Name:

Instructions

Do not delete or change the name of this task template.

1

2

3

Late Notifications Email Example...

-----Original Message-----

From: Forker, Brent (Morse TEC Ithaca)
Sent: None
To: Hilfiger, Tanya (Morse TEC Ithaca)
Subject: Late Notification

You have new Teamcenter Engineering mail from infodba (infodba)

Task Name:

Late Task Notification from Late Task Monitor

Process "Reason Sheet CA0636A/B-Check Val", Task "perform-signoffs" has passed its due date of " 7-Apr-2006 15:10:38".

Distribution List

Hilfiger Tanya

|
To view envelope, please see:

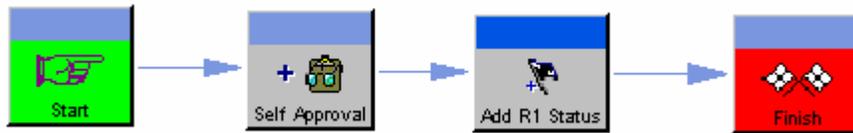
<http://ith-tceng:8080/cgi-bin/iman/QdGRjJlil1HHvD>

I

Detour...



Adding Status!



First you create
then you add.

Handlers

Add R1 Status

- Assign
- Start
 - create-status
 - EPM-set-rule-based-protection
 - BW_notify
- Perform
- Complete
 - add-status
 - set-status

Handler Type: Quorum:

Task Action: Start

Action Handler: create-status

Argument	Value(s)	
R1		

Handlers

Add R1 Status

- Assign
- Start
 - create-status
 - EPM-set-rule-based-protection
 - BW_notify
- Perform
- Complete
 - add-status
 - set-status

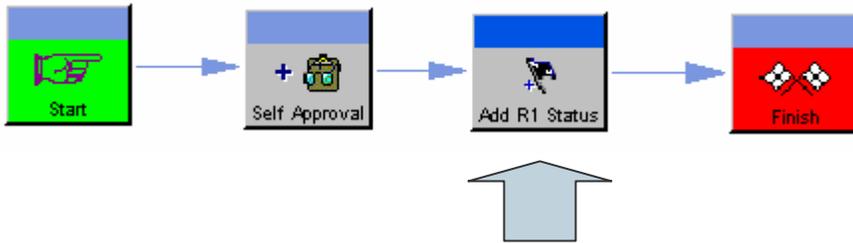
Handler Type: Quorum:

Task Action: Complete

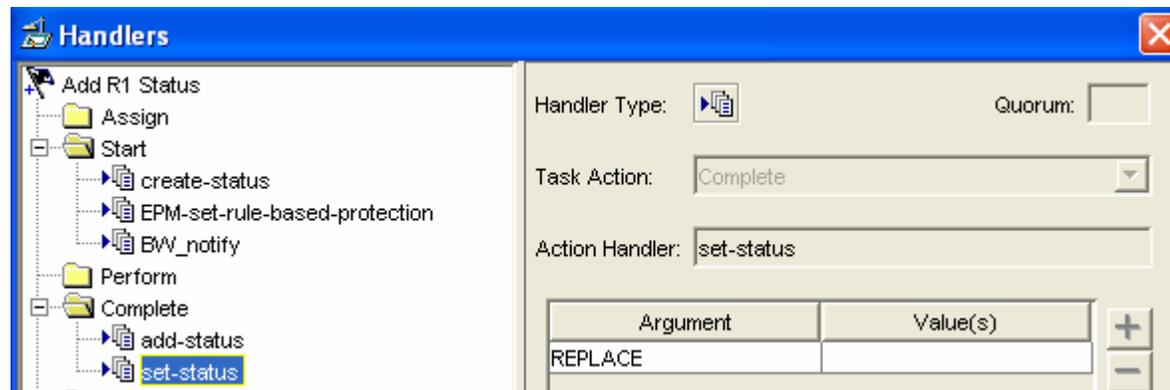
Action Handler: add-status

Argument	Value(s)	
----------	----------	--

Replacing Status!



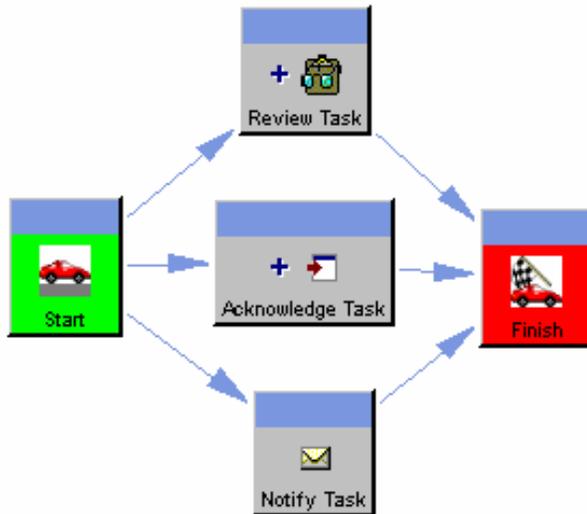
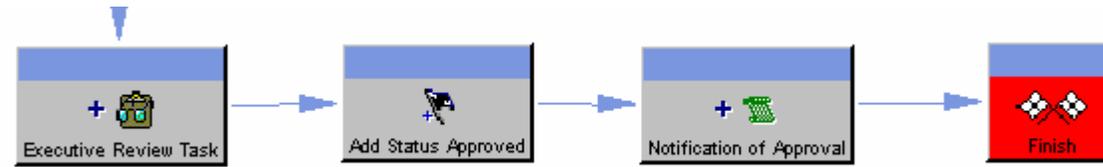
Sometimes you want to be able to just have one status applied to an object if it goes through more than one job.



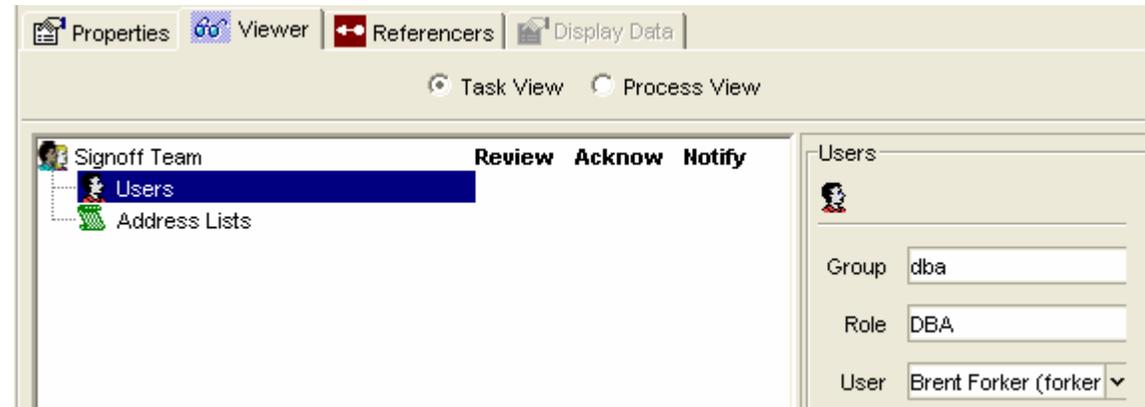
So you have options of Append, Replace and Rename.

Remember that status is used to configure BOM's in PSE via Revision Rules!

Route to Notify!



Ok so at the end of the process you want to notify someone about its completion. To do that you can use a Route Task.



UGS Note: Please make it an argument to select the default button selection.

How many Routes are there?

Action Handler:

Can be placed anywhere in a process.

Only notifies via Office mail unless \$PROCESS and/or \$TARGET are present.

Subject and Comments controlled by what string we enter.

Action Handler:

Can ONLY be placed in the perform-signoffs task according to the docs.

Only notifies via Office mail, period.

Beauty of this handler is the report options.

Subject and Comments controlled by what string we enter.

Action Handler:

Can be placed ONLY in the Complete Action of the Route task.

Only notifies via OS mail unless \$PROCESS and/or \$TARGET are present.

Subject and Comments controlled by what string we enter.

You have mail!

```
From: BForker@morse.morse
To: bforker@morse.bwauto.com
Cc:
Subject: Release progress report review task subject
```

Please see following URL for more information:
<http://ith2000iman:8080/cgi-bin/iman/AqLBXF49i1HHvD>

```
job name:          mail test 6
current release level Mail Review Task
target:
  name             type
-----
  testfor2files   MSWord
-----
references:
  name             type
-----
  no reference objects found
-----
```

```
Release Level:      Mail Review Task
Reviewer            Decision      Date          Comments
-----
Release Level:      Review Task
Reviewer            Decision      Date          Comments
=====
```

review task comments

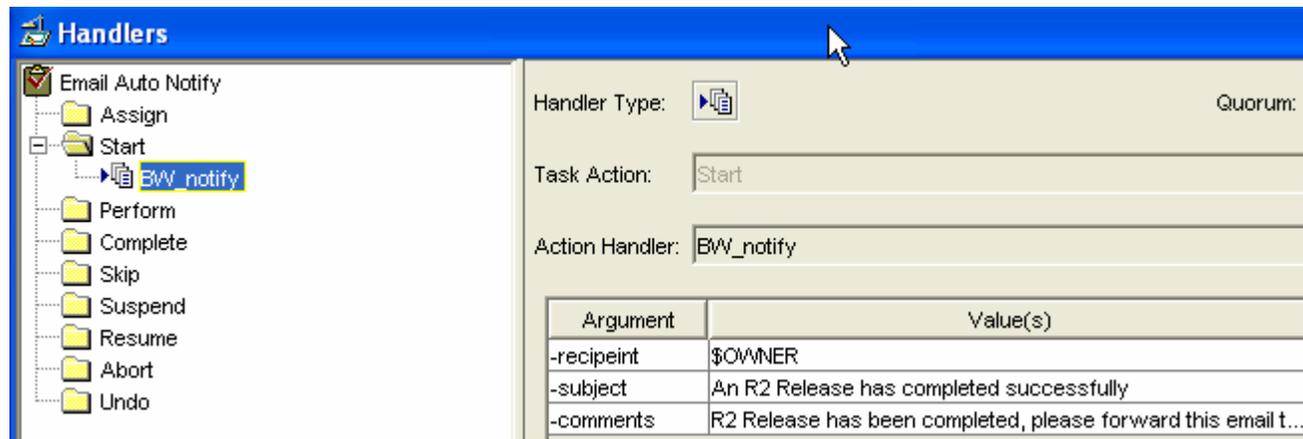
OOTB is Name?
What about the
part number?

The others are just “You have mail from TcEng go there and do something !”

Forget the Route and create your own!



People at Morse do everything via Outlook mail. Therefore it was easier to just email the owner and let them use Outlook to forward.

A screenshot of a software interface titled 'Handlers'. The left pane shows a tree view with folders like 'Assign', 'Start', 'Perform', 'Complete', 'Skip', 'Suspend', 'Resume', 'Abort', and 'Undo'. Under 'Start', there is a sub-folder 'BW_notify' which is selected. The right pane shows configuration for the selected handler: 'Handler Type' is set to a document icon, 'Task Action' is 'Start', and 'Action Handler' is 'BW_notify'. Below this is a table with columns 'Argument' and 'Value(s)'.

Argument	Value(s)
-recipient	\$OWNER
-subject	An R2 Release has completed successfully
-comments	R2 Release has been completed, please forward this email t...

UGS Note: Will you implement our code if we “give” it to you?

Ahhh....my own!

```
From:   bforker@ith-exchange-3.ithaca.morse.borgwarner.net
To:     Forker, Brent (Morse TEC Ithaca)
Cc:
Subject: [Self Approval] Your data has now been R1 Released Successfully
```

Text from Subject arg

Please see following URL for more information:

<http://ith-tceng:8080/cgi-bin/iman/ATMRjGnHi1HHvD>

Job name

Job Name: 5008043/A-Brents cn

Template Process Name

Workflow Process: Global R1 Drawing Release

Task Name: Self Approval

Task Name

Targets:

ID	Type
5008043/A-Brents cn	BWPart Revision
DWG_5008043/A-Brents cn	Image
3D_5008043/A-Brents cn	DirectModel

Target Object ID

References:

ID	Type
no reference objects found	

R1 Release has been completed

Text from Comment arg

For more on “my own”!

**See Richard Meagher's
Presentation on
Thursday at 9:30 AM!**

Don't get me started !

From: bforke@ith-exchange-3.ithaca.morse.borgwarner.net
To: Forker, Brent (Morse TEC Ithaca)
Cc:
Subject: [Self Approval] Your data has now been R1 Released Successfully

Please see following URL for more information:
<http://ith-tceng:8080/cgi-bin/iman/ATMRjGnHi1HHvD>

Job Name: 5008043/A-Brents cn
Workflow Process: Global R1 Drawing Release
Task Name: Self Approval

Targets:

ID	Type
5008043/A-Brents cn	BWPart Revision
DWG_5008043/A-Brents cn	Image
3D_5008043/A-Brents cn	DirectModel

References:

ID	Type
no reference objects found	

R1 Release has been completed

Portal link, and portal is not running already, this works fine. However if portal session is already running, it starts a new one.

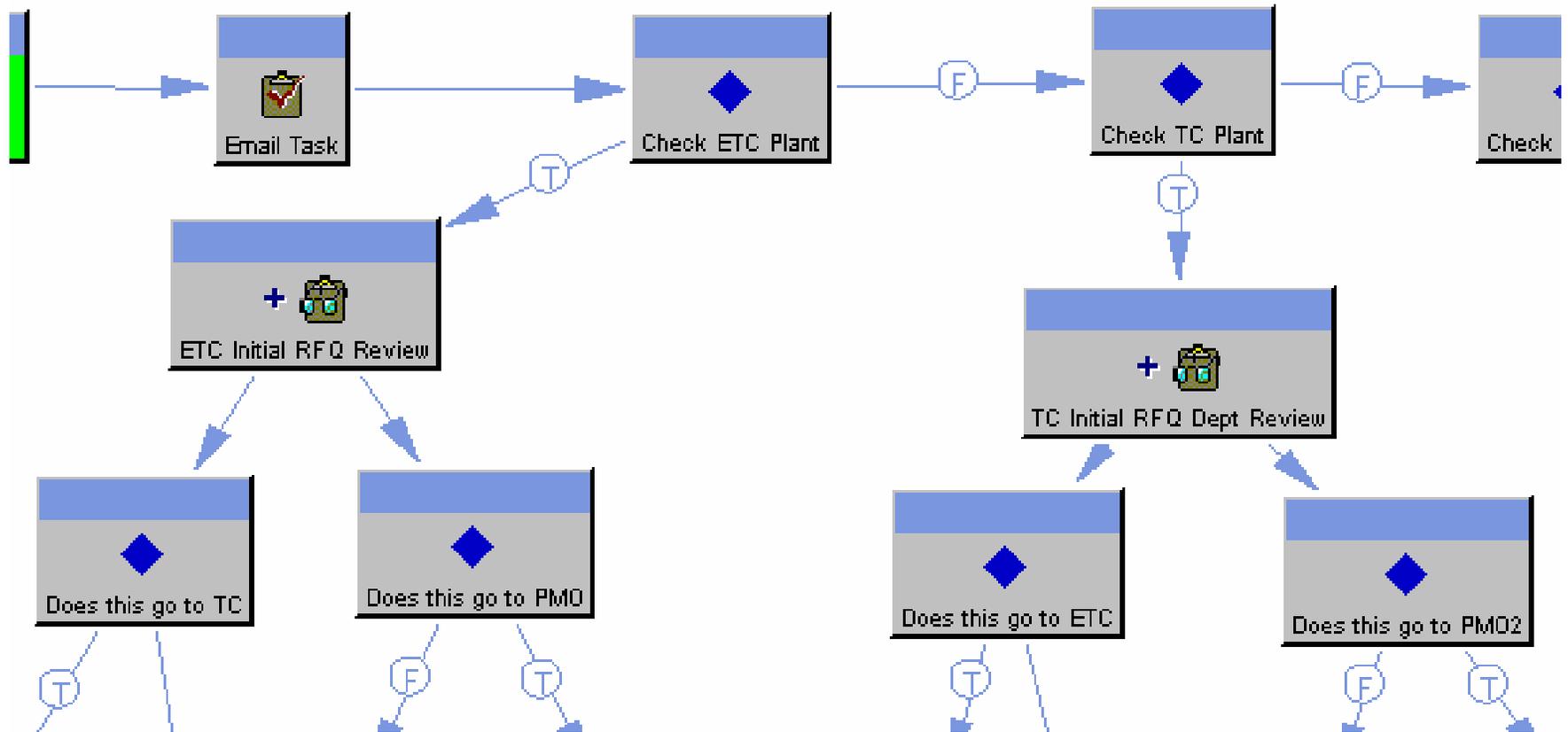
DHTML link, and web not running, when you log in you are then in the main Home page. If you are already logged in the link works properly.

URL ?

Does work great if I
am already logged
into the Web...!

UGS Note: Make this work for portal and web, and go to the spot after I log in !

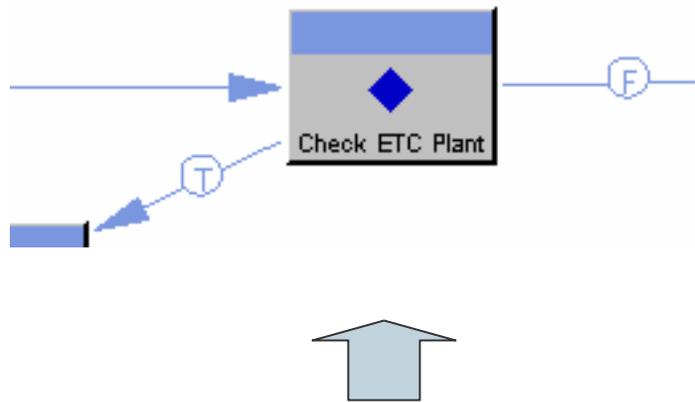
The Family Tree!



So what if you want some logic in your workflow? Hope it's not fuzzy ☺

UGS Note: Please supply branching by a value!

The Automatic Branch!

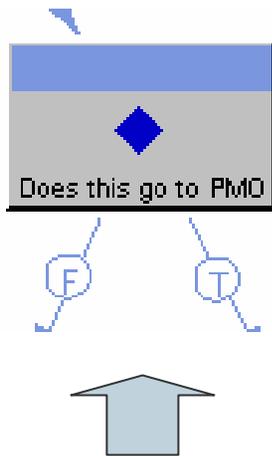


The screenshot shows the 'Attributes' panel for the 'Check ETC Plant' task. The panel is titled 'Attributes' and contains the following fields:

- Named ACL:
- Task Type:
- Icons:
- Condition Query:
- Duration:

Select the task then the Task Attribute Panel. Click on the Condition Query and you end up in Query land.

The Manual Branch!

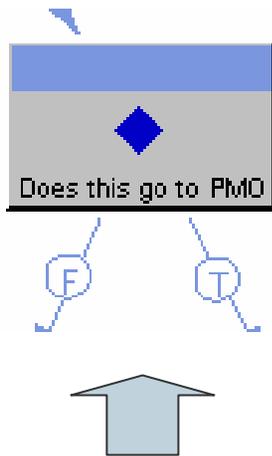


Attributes

Named ACL:	<input type="text" value="🔒"/>
Task Type:	<input type="text" value="EPMConditionTaskTemplate"/>
Icons:	<input type="text" value="◆"/>
Condition Query:	<input type="text" value="◆ (empty)"/>

The Condition Query is left empty....

The Manual Branch Interaction!



Perform Condition Task

Task Name: Does this go to PMO

Task Instructions: Please check true if this goes to PMO and false if not.

Task Result: true false unset

Cancel

Magic Forms!

The diagram illustrates a process flow and its configuration. On the left, a vertical flow shows a 'Start' task (green box with a hand icon) leading to a 'Complete Form' task (blue box with a plus icon). A large arrow points from the 'Complete Form' task to the 'Handlers' window on the right.

The 'Handlers' window displays a tree view of tasks and their handlers. The 'EPM-create-form' handler is selected under the 'Start' task. The configuration for this handler is shown in the right pane:

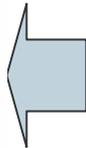
- Handler Type:
- Quorum:
- Task Action: Start
- Action Handler: EPM-create-form

Below the configuration, a table lists arguments and their values:

Argument	Value(s)
-type	BW_Met_Lab_form
-location	\$ROOTTask.\$TARGET

Sometimes it is nice to be able to create new forms as part of a process. We create a work request form here at the start of the Do Task which is then added as a Target of the job.

Magic Form Appearance!



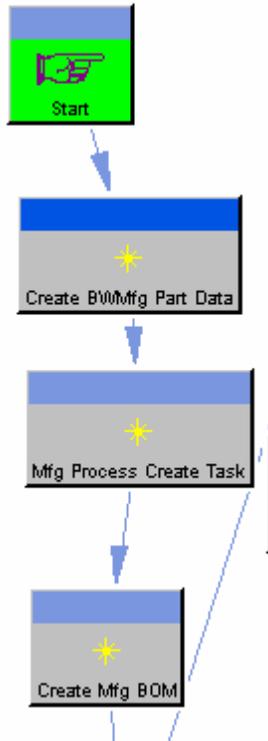
You can use the EPM-display-form to display a form created this way but there is no OOTB way to complete the task ☹️
You must customize...

A screenshot of a web-based form with the following fields:

- A.Plant:
- B.Part Number:
- C.Part Rev:
- D.Job Description:
- E. Supplier (if applicable):
- F. Notes, Lot No. PWO No.:
- G.Number of Parts:
- H.Customer Name:
- I.Program Name:
- J.Due Date:
- K.Priority Date (SUPERVISORS ONLY):
- La.Assign to #1:
- Lb.Assign to #2:
- M.Discrepant Dims Verified By:

UGS Note: Wouldn't it be cool if out of the box you could use this with a "form" task that includes a done check box?

Verifying that the data is there!



We had this requirement with V8 so we had to write our own. We want to replace it with OOTB handler.

Argument	Value(s)
-revrule	Latest Working

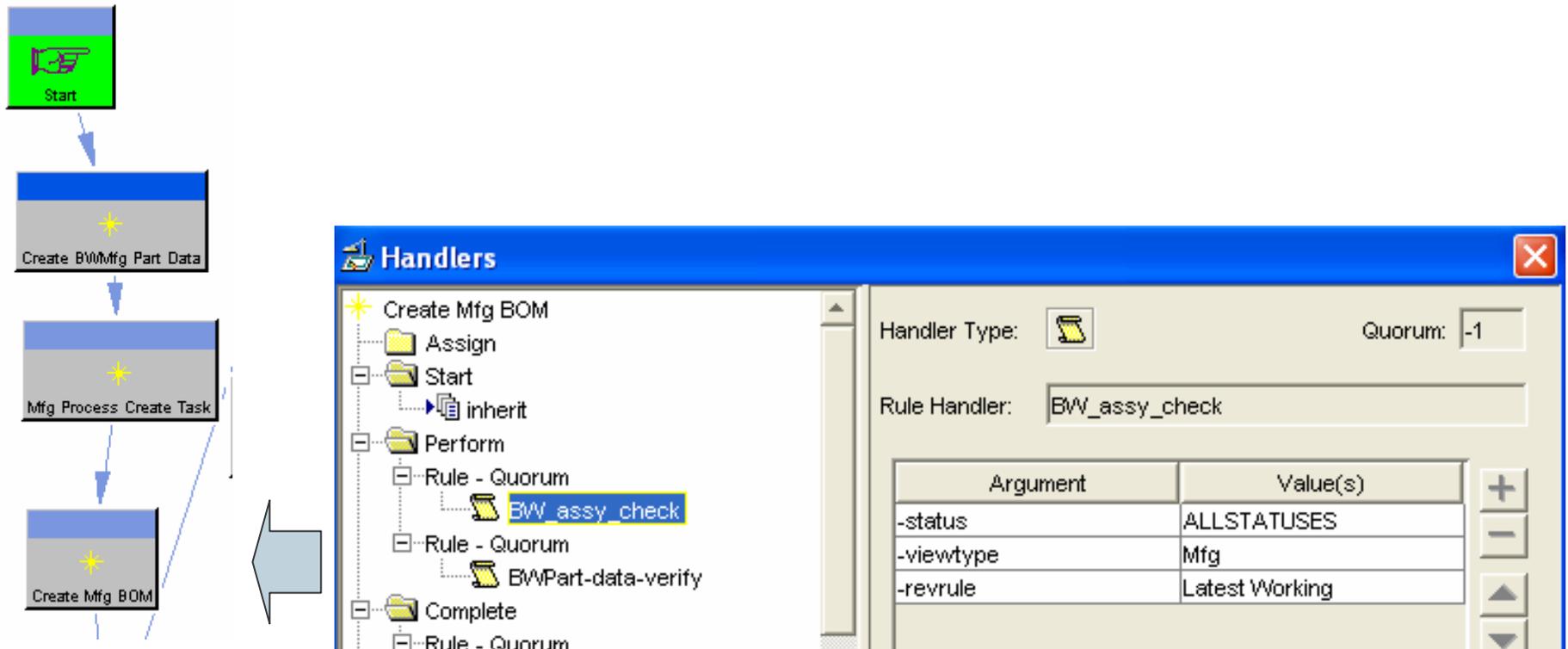
You can use the EPM-check-object-properties rule handler to check for values and nulls on the perform action, however again this did not work in 9.1.2.4. It was reported fixed in V9.1.2.9 and V10.0.

Verified by the user!

The image illustrates a business process flow and its associated data entry and error handling. On the left, a flowchart shows the sequence: Start → Create BWMfg Part Data → Mfg Process Create Task → Create Mfg BOM. A large arrow points from this flow to the main application window. The application window, titled 'ETC_500009/001', displays the 'BW Part Information' form. The form includes fields for Design Part ID (5000009), Design Part Rev (B), Plant (ETC), Supplier, Planner, Buyer, Weight (0.0000), and UOM (EA). Below the form, a task list shows 'ETC_500009/001-Chain MTJ Test A (Create BWMfg)'. An 'Error' dialog box is open, displaying the following message: 'Business rules for handler 'BWMfg-part-data-verify' on action 'Perform' in task 'Create BWMfg Part Data' are not met. Weight Field in ETC_500009/001-Chain MTJ Test A is blank or is set to 0. Product Line Field in 5000009/B-Chain MTJ Test A is blank.'

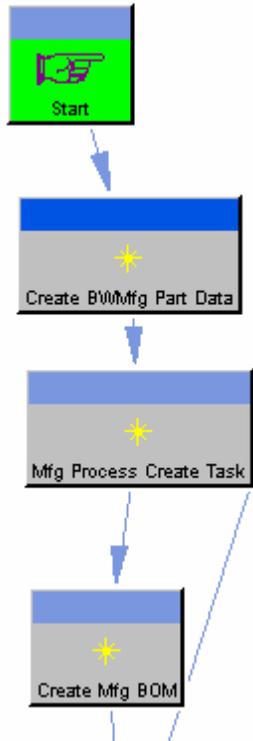
In our case the handler returns specific information on what is not met and transverse object types.

Talking to the other side!

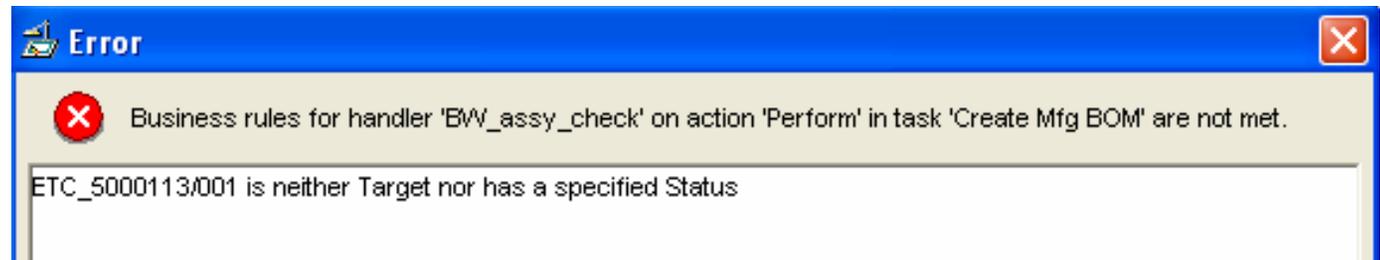


At some point you want to connect to ERP so you may want to ensure that all components of an assembly have been released.

Talking to the other side!

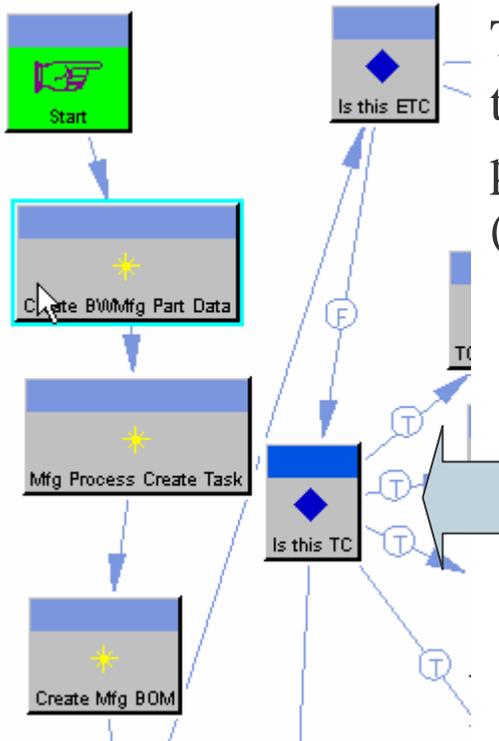


This handler checks to see if the components in the Assembly have been released or are targets of the current job.



UGS Note: Current assembly related handlers, EPM_Check_Assembly_Status and/or EPM-attach-assembly-components, do not meet our requirements again but come close.

Telling the other side!



This handler grabs the Item Revision Master information and the BOM's out of TcEng and puts them in an xml file. A process then picks the file up and creates the data in ERP (JDE).

The screenshot shows the 'Handlers' configuration window. The tree view on the left shows the following structure:

- Is this TC
 - Assign
 - Start
 - Rule - Quorum
 - check-condition
 - BW_erp_extract**
 - set-condition
 - Perform
 - Complete
 - Rule - Quorum

The configuration details for the selected handler are as follows:

Handler Type:		Quorum: -1
Task Action:	Start	
Rule Handler:	BW_erp_extract	
Argument	Value(s)	
-revrule	Latest Working	+
-viewtype	Mfg	-

Wrap Up !

- TcEng Workflow is quite good but:
 - It takes a LARGE amount of time configuring and testing to ensure workflows work as intended.
 - UGS needs to understand that once people start to run their businesses using workflows in TcEng it is no longer acceptable to have ANY issues with workflows not working!
 - E.G. 100% inspection required !!!
 - And once again the documentation cannot be trusted.

Questions ?

