



COLLABORATE12
TECHNOLOGY AND APPLICATIONS FORUM
FOR THE ORACLE COMMUNITY



Oracle Workflow Use and Administration Made Easier

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About the Speaker

- Oracle Ace
- Over 35 years System Design and Support
- Over 20 years E-Business Suite support
- 14 years Oracle Workflow design and support
- Former OAUG President
- Over 100 presentations at multiple venues
- Co-Author *The ABCs of Oracle Workflow for E-Business Suite Release 11i and Release 12*



Agenda

- Overview/Business Benefit
- Workflow Suggestions by Role
- Workflow for End Users
 - Personal Worklist
 - Status Monitor
 - Diagnostic Reports
- Workflow for Super Users
 - Junior Administrator
 - Worklist Access
 - Workflow Related Concurrent Requests



Agenda

- Workflow for Administrators
 - Oracle Applications Manager
 - Administration Menus
 - Worklist Flexfields
- Workflow for Developers and DBAs
- References and More Presentations



Overview

- Presentation covers R12, but....(if still on 11i)
- Workflow Functionality in Release 12 and Release 11i.10 (if patched to RUP7) are nearly identical
 - Forms may look different due to new R12 look-and-feel
- Focus on
 - Efficiency that empowers users
 - Setups that ensure proper operation
 - Administration methods that
 - Prevent trouble
 - Speed recovery when the unexpected happens

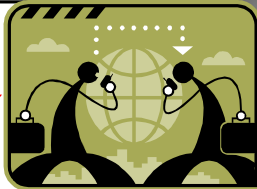


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NOTIFY HELP DESK



HELP DESK DISPATCHES
ADDITIONAL HELP



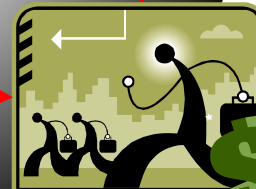
CALL CO-WORKER
(AGAIN)



CALL ORACLE (AGAIN)



Override through
MANUAL PROCESS



CUSTOMER INQUIRY



PROCESS TIME

PROBLEM
OCCURS

WITH TROUBLESHOOTING EDUCATION



RESOLVE THROUGH
SELF KNOWLEDGE



CUSTOMER GETS
PRODUCT



NET SAVINGS



Workflow Troubleshooting by Role

- Workflow End Users
 - Personalize notification page
 - Monitor your own workflows
 - Run Diagnostic Reports for Functional Areas
- Workflow Functional Super Users
 - End User recommendations plus...
 - Run workflow specific concurrent programs
 - Junior Administrator
 - Worklist Access to SYSADMINs emails



Workflow Troubleshooting by Role

- Workflow Administrators
 - Super User recommendations plus.....
 - Worklist Flexfields
 - Troubleshoot all workflows using OAM and Administration Menus
 - Purge
- Workflow Developers/DBAs
 - Setup workflows properly
 - Avoid Cloning issues



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WORKFLOW TROUBLESHOOTING FOR END USERS



Improved Efficiencies for Users

- Provide end users tools for efficiency
 - Add 'Personal Worklist' to menus
 - Provide training for use of the status monitor and other features
 - Set owner attribute in workflows where needed
 - Provide access to diagnostic reports
 - Oracle Diagnostic Tool Responsibility
 - Security is built in – you can only access reports related to responsibilities you are assigned



Seeded User Menu

- Workflow User Web Applications
 - Advanced Worklist
 - Self Service Workflow
 - Home Page
 - Status Monitor
 - Notifications – same as Advanced Worklist

ORACLE® Self Service Workflow

Diagnostics Home Logout Preferences Help Personalize Page

Home Status Monitor Notifications

Welcome Stock, Pat
to Oracle Workflow

Notifications

Below is a list of your most important notifications. Select the subject to respond or select "Full List" to see all your notifications. [Full List](#)

From	Type	Subject	Sent	Due
PA Workplan Workflow		Workplan Version EC-100: Workplan VIII. 4 (EC-100, EC-100) published	03-Aug-2006	
PO Create Documents		Standard PO : 5362 created.	09-Aug-2006	
PO Requisition Approval		Purchase Requisition 2528 has been returned by the buyer	03-Feb-2009	
XXHR Validate New Employee		Please set up the email address for Bowen, Mrs. Carol and enter it below	04-Feb-2009	05-Feb-2009
XXHR Validate New Employee		Please set up the email address for Bowen, Mrs. Carol and enter it below	04-Feb-2009	05-Feb-2009

✓ **TIP** [Vacation Rules](#) - Redirect or auto-respond to notifications.
✓ **TIP** [Worklist Access](#) - Specify which users can view and act upon your notifications.



Personal Worklist

- Add the function 'Personal Worklist' to the Workflow User menu for additional features

Menu: FND_WFUSER
User Menu Name: Workflow User
Menu Type: Standard
Description: Workflow User menu

Seq	Prompt	Submenu	Function	Grant
5	Advanced Worklis		Advanced Workflow Work	Advanced Notifications Worklis
10	Self Service Work	Workflow Self-Service Nav		Personal Home Page Navigation Men
20		Workflow Guest Self-Serv		Menu for "guest" status monito
25	Status Monitor Po		Workflows	Portlet displaying user's workflows ci
36		Workflow Self-Service App		Self-service workflow incorporating ne
40	Personal Worklis		Personal Worklist	

Add the Personal Worklist function to the menu for additional features



Personal Worklist

- Personal Worklist additional Features

Personalize – create new views or change existing view

Simple Search – search for specific notifications

Export – downloads to .csv file format

The screenshot shows the Oracle Personal Worklist interface. At the top, there's a navigation bar with links: Diagnostics, Preferences, Help, Personalize Page, Close, and Log Out. Below this, the 'Worklist' section is visible. It includes a 'View' dropdown set to 'Open Notifications', a 'Go' button, and a 'Personalize' button. There are also buttons for 'Select Notifications', 'Open', 'Reassign', 'Close', 'Close', and 'Export'. A 'Simple Search' button is located on the right. Below these buttons is a table with columns: Select From, Type, Subject, Sent, and Due. The table contains four rows of notifications, all of which are 'Expenses Export' except for the last one, which is a 'PO Requisition Approval'. The 'Export' button is highlighted with a callout indicating it downloads to .csv file format. At the bottom, there are two tips: 'TIP Vacation Rules - Redirect or auto-respond to notifications.' and 'TIP Worklist Access - Specify which users can view and act upon your notifications.'

Select From	Type	Subject	Sent	Due
<input type="checkbox"/>	Expenses Export	Expenses Export Rejection	Feb-2008	
<input type="checkbox"/>	Expenses Export	Expenses Export Rejection	Feb-2008	
<input type="checkbox"/>	Expenses Export	Expenses Export Rejection	Feb-2008	
<input type="checkbox"/> Brown, Casey	PO Requisition Approval	Purchase Requisition	Nov-2007	

✓ TIP Vacation Rules - Redirect or auto-respond to notifications.
✓ TIP Worklist Access - Specify which users can view and act upon your notifications.



Personal Worklist Simple Search

- Use Simple Search to search for specific notifications in your worklist

ORACLE®

Diagnostics Preferences Help Personalize Page Close Window

Worklist

Save Search

Simple Search

Note that the search is case insensitive

Subject

From

Sent

Go Clear

Advanced Search Worklist Views

Export

Select	Subject	From	Sent	Type	Status	Due
	No search conducted.					

✓ TIP Vacation Rules - Redirect or auto-respond to notifications.
✓ TIP Worklist Access - Specify which users can view and act upon your notifications.

Save Search



Personal Worklist Advanced Search

- Or Increase ability to find notifications in your worklist using Advanced Search

ORACLE® Workflow

Navigator Favorites Diagnostics Home Logout Preferences Help Personalize Page

Logged In As OPERATIONS

Worklist

Advanced Search

Specify parameters and values to filter the data that is displayed in your results set.

☒ Show table data when all conditions are met.
☐ Show table data when any condition is met.

Subject is

From is

Message Attribute is

Sent is

Type is

Go Clear Add Another Type Add

Select Subject From Sent Type Status

No search conducted.

TIP Vacation Rules - Redirect or auto-respond to notifications.
TIP Worklist Access - Specify which users can view and act upon your notifications.

Closed
Due
From
From Me
FYI
Information Requested From
Message Attribute
Message Name
Notification ID
Priority
Response Required
Sent
Status
Subject
To
Type
Type Internal Name



Status Monitor

- Check the status of approval of your requisitions

ORACLE® Self Service Workflow

Home **Status Monitor** Notifications

Status Monitor >
Monitor Search

Workflows

Search

Specify search criteria and select "Go" to find workflows.

* Status

☐ Hide Search Options

* Workflow Started

Workflow Type

Results: Workflows

To see all notifications sent by the workflow, click "Notification History." Select "Participant Responses" to view comments and other data collected for response-required notifications.

☒ TIP Workflow histories are periodically purged from the system and may no longer be available for review.

Select Workflow and click on the **Notification History** | **Status Diagram** | **Participant Responses** button

Select	Status	Workflow Type	Workflow	Process Name	Started
<input type="radio"/>	✓	Active PO Requisition Approval	134002-391957	Main Requisition Approval	02-Nov-2007 09:15:23
<input type="radio"/>	✗	Error PO Requisition Approval	5146-6228	Main Requisition Approval	16-May-2000 09:47:24
<input type="radio"/>	✓	Active PO Requisition Approval	6001-7188	Main Requisition Approval	25-Sep-2000 07:19:04

Callout 1: Click on status monitor
Enter search criteria
Click Go to search

Callout 2: Click the radio button next to a process
Then click the Notification History, Status Diagram or Participant Responses button



Status Monitor

- Notification History Page
 - All notifications sent by the workflow process selected
 - Click recipient name to send an email
 - Reassign if recipient is unavailable

ORACLE® Self Service Workflow Diagnostics Home Logout Preferences Help Personalize Page

Home **Status Monitor** Notifications

Status Monitor > Monitor Search >

Monitor Activities History

Notification History: 134002-391957

Workflow Type **PO Requisition Approval** Started **02-Nov-2007 09:15:23**
Status **Active** Completed

Current Status

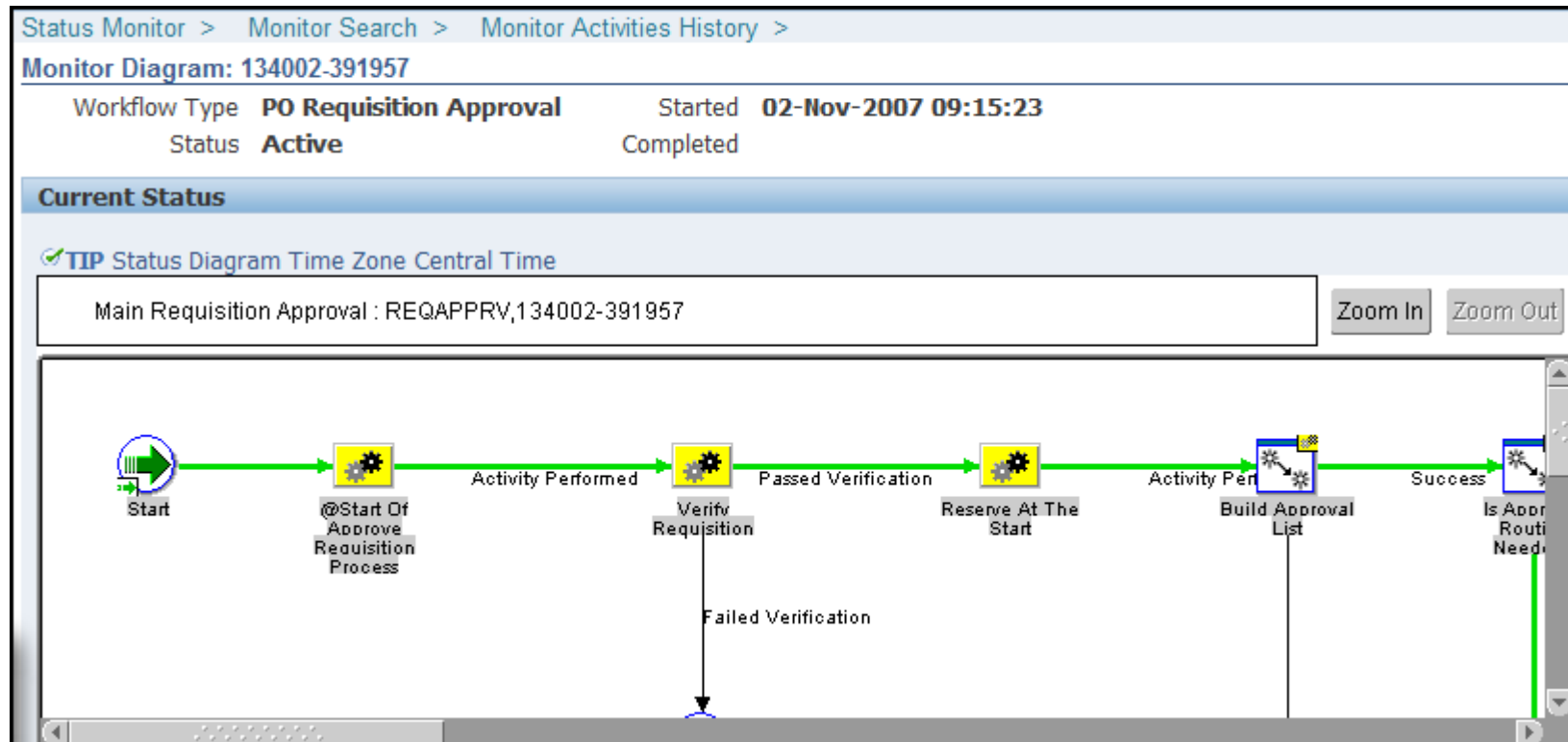
Select Notification and...

Select	Status	Notification Subject	Notification Recipient	Notification Sent	Response Received	Response	Activity
<input type="radio"/>	<input checked="" type="checkbox"/>	Notified Purchase Requisition 1434 for Stock, Pat (43,000.00 USD)	Baker, Catherine	02-Nov-2007 09:15:24			Approve Requisition Notification



Status Monitor

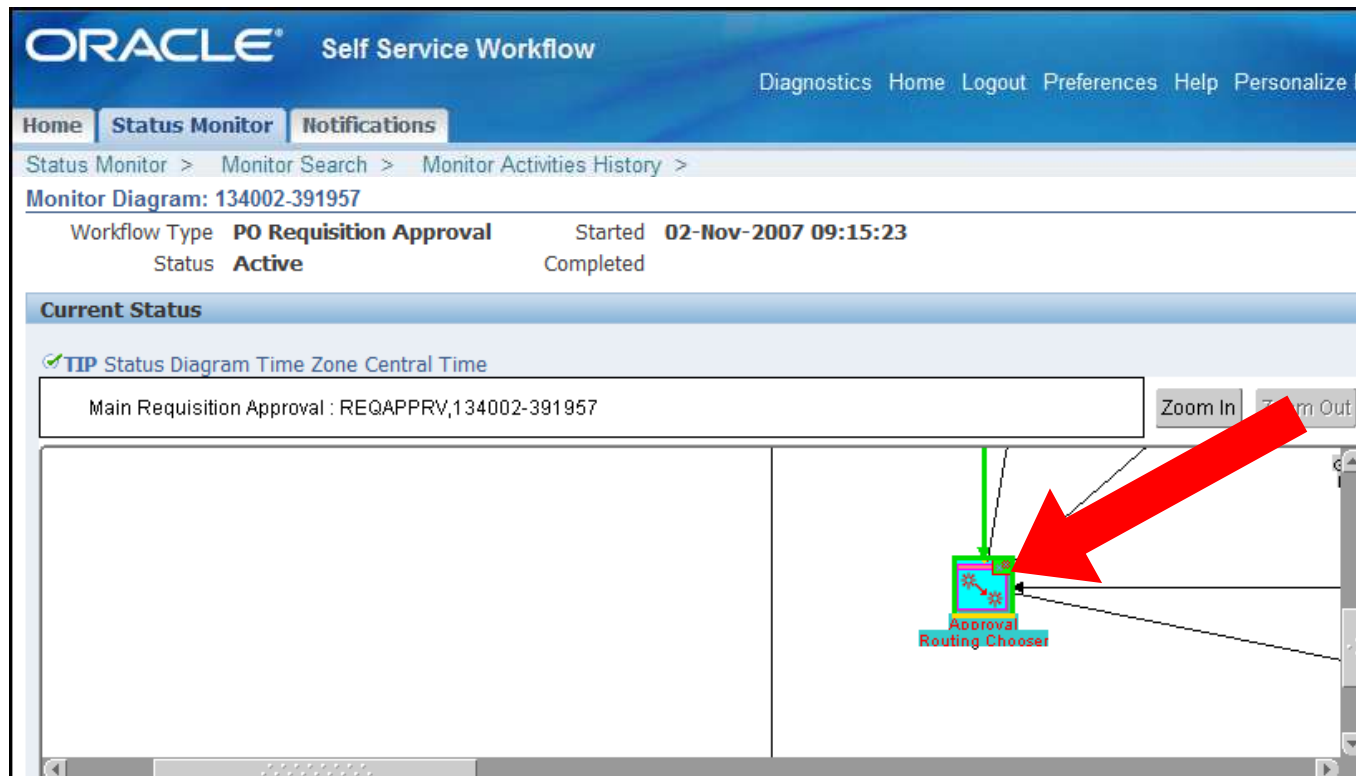
- Follow the green line to follow the process





Status Monitor

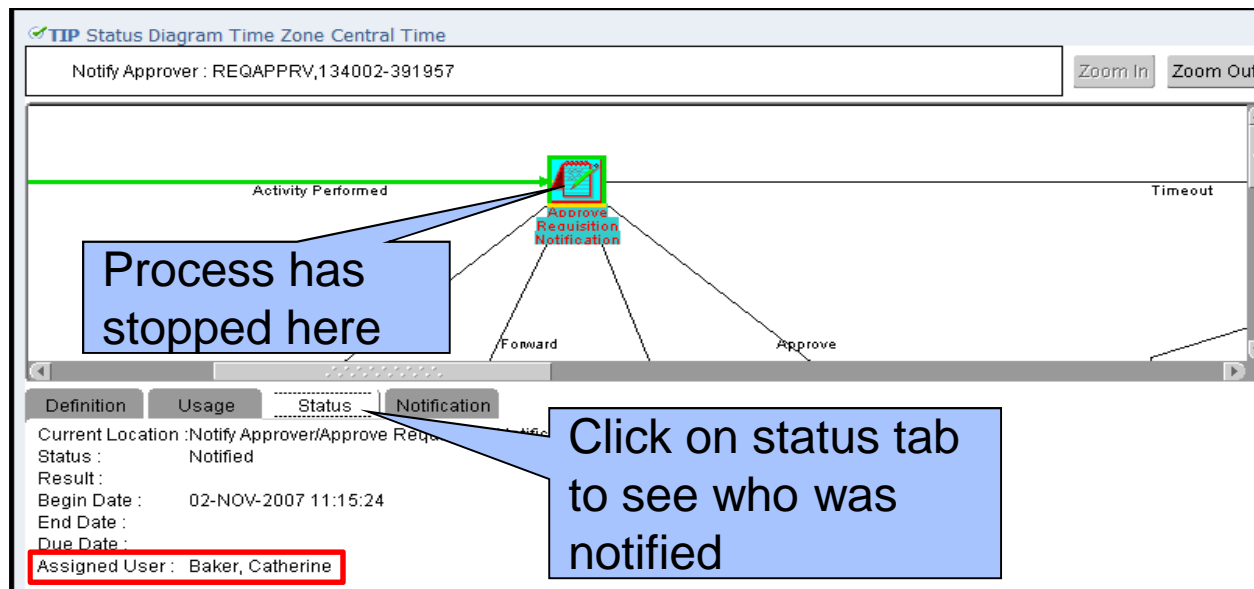
- Double click in the process box to drill down





Status Monitor

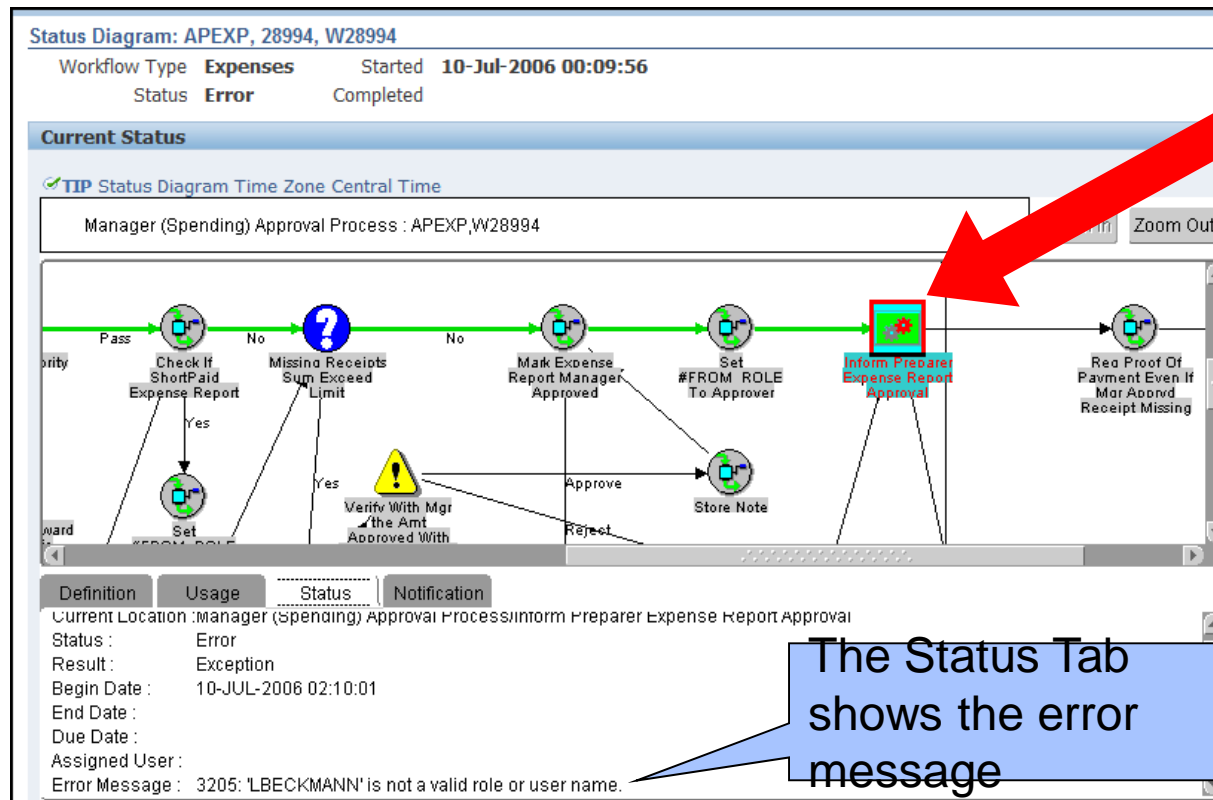
- Tabs below the status monitor provide information about the node
 - Notification has been sent to Catherine Baker
 - Catherine has not responded





Status Monitor

- Errored items appear outlined in red



The Status Tab
shows the error
message



Status Monitor

- Participant Responses Tab shows responses to all the notifications for the workflow process selected

Home | **Status Monitor** | Notifications

Status Monitor > Monitor Search > Logged In As OPERATIONS

Monitor Responses

Notification List: Approval Test 16-AUG-2011 00:26:11

Workflow Type **Journal Batch** Started **16-Aug-2011 00:27:02**
Status **Complete** Completed **16-Aug-2011 00:30:26**

Search

Set activity filters and select the "Go" button to view corresponding results.

☒ Response Notifications
☐ FYI Notifications
☒ Closed Notifications

Notification List

Activity	Notification Subject	Recipient	Comment	Notification Response	View Response Details
Request Approval From Approver	Journal batch Approval Test 16-AUG-2011 00:26:11 requires your approval.	Brown, Casey		Approve	



Diagnostic Reports

- Need Oracle Diagnostic Tool Responsibility
 - Starting in 12.0.6, RBAC is utilized for Diagnostics
 - See MOS Note: 753979.1
- Sample of workflow related user tests
 - Other workflow related tests are available

Po Approval	<p>This test collects all the data related to approvals for any purchasing document type. Use this test whenever a data collection of approvals data is required specific to a document.</p> <p>Parameters: Responsibility, Operating Unit, Document type and document number are required. Release number is only required when collecting workflow data for a release against a blanket or contract agreement. Leave this parameter blank in all other cases.</p> <p>To resolve any issues with the execution of this test, please refer to the Diagnostics FAQ.</p>
Account Generator	<p>This diagnostic test will help diagnose issues related to the PO Account Generator for non-OPM installations. This test is meant for items of type expense and inventory and not shop floor</p> <p>To resolve any issues with the execution of this test, please refer to the Diagnostics FAQ.</p>



Diagnostics

- MOS Note: 1083807.1 shows full catalog for 12.1.3
 - Look for Diagnostics in applications other than workflow

Order/Line Workflow Validation			
Close Ready Headers (without WF)	732137.1	This test lists open order headers that do not have open lines and WF details.	Setup
Lines In WFERROR/OMERROR	732143.1	This test lists lines that have WFERROR/OMERROR flows, but are no longer in error	Setup
Lines In Workflow Error	732146.1	This diagnostic test shows the summary of order lines that are stuck in Workflow	Setup
Order Headers Ready To Close	732133.1	This diagnostic test identifies order headers that are ready to be closed.	Setup
Orphan Workflows	732142.1	This diagnostic test identifies line flows that do not have corresponding order	Setup
Workflow Status	732147.1	This test prints the detailed information of Header/Line Workflow status	Setup



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WORKFLOW TROUBLESHOOTING FOR SUPER USERS



Junior Administrator

- Allows limited Administration of workflows
 - By workflow Type (up to 10 per grant)
 - By administration action (view, retry, abort, etc)
 - Recommend View and Retry
- Applies only to Status Monitor, does not grant admin rights to events, notifications, etc
- OAUG Conference Paper Database
 - What's New in Workflow: 11iRUP5, RUP6 and R12
 - Includes detail setup instructions for Junior Administrator



Worklist Access

- Grant access to SYSADMIN emails
 - Must login as SYSADMIN to create grant

- Use Personal Worklist and Worklist Flexfields to show error message
 - Enable Export button



Retry Errored Workflows

- Dates - based on error date – not on original start date
- Perform Commit
 - 'No' = commit at end
 - 'Yes' = commit after each retry

Parameters	
Item Type	PO Approval Error
Item Key	
Process Name	
Activity Label	DOCUMENT_MANAGER_FAILED_SYSADM
Errored On or After (DD-MON-RRRR)	
Errored On or Before (DD-MON-RRRR)	
Maximum Retries	5
Perform Commit	Yes



Resend Failed/Error Workflow Notifications

- Resend notifications with a mail status of FAILED or ERROR
 - Make corrections first such as email address corrections

The screenshot shows the 'Submit Request' dialog box in Oracle Workflow. The 'Name' field is highlighted with a yellow background and contains the text 'Resend Failed/Error Workflow Notifications'. The 'Parameters' tab is selected, showing fields for 'Mail Status', 'Message Type', 'Recipient Role', 'Notifications sent on or after', and 'Notifications sent on or before'. The 'OK', 'Cancel', 'Clear', and 'Help' buttons are at the bottom right.



Resend Failed/Error Workflow Notifications

- **Caution**
 - You don't always want old notifications to be sent
 - Many workflow systems need cleanup and have orphaned workflows and notifications many years old
 - Consider first a SQL update to WF_NOTIFICATIONS to set MAIL_STATUS to null where STATUS = 'CLOSED' or 'CANCELLED'
 - STATUS is the workflow status
 - MAIL_STATUS is the notification status
 - Refer to the workflow book for more details on cleanup of your workflow system



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WORKFLOW TROUBLESHOOTING FOR ADMINISTRATORS



Workflow Administrator

- Set to Responsibility
 - Workflow Administrator Web Applications
- Ensure patches do not reset value
 - AutoConfig parameter s_wf_admin_role
- Add ability to run concurrent requests to menu and create appropriate request group
- Ensure SYSADMIN and user assigned to Mailer have this responsibility



Workflow Directory Services User/Role Validation

- Symptoms
 - Not receiving notifications
 - Missing responsibilities for users
- MOS Note: 429852.1
 - Follow recommendations based on current release
- MOS Note: 1246824.1
 - Run “Workflow Directory Services User/Role Validation “ with argument values as 10000:Yes:Yes:No:Null
 - Run “Synchronize WF Local Tables” with default values



Workflow Directory Services User/Role Validation

- Run Twice
 1. Fix Dangling User/Roles
 - Fix Dangling User/Roles=Yes
 - Removes association from WF_LOCAL_USER_ROLES if user or role is missing
 - Add Missing User/Role Assignments=No
 2. Add Missing User/Role Assignments
 - Fix Dangling User/Roles=No
 - Add Missing User/Role = Yes
 - Adds missing associations in the WF_LOCAL_USER_ROLES to have corresponding user/role assignments in the WF_USER_ROLE_ASSIGNMENTS table

The screenshot shows the 'Submit Request' dialog box for the 'Workflow Directory Services User/Role Validation' request. The 'Name' field is highlighted. The 'Parameters' section is expanded, showing the following settings:

Parameter	Value
p_BatchSize	10000
p_Check_Dangling	No
Add missing user/role assignments	No
Update WHO columns in WF tables	No
Number of parallel processes	

The 'OK' and 'Cancel' buttons are visible at the bottom right.



CRM Workflow Issues

Synchronize Workflow Roles

- Symptom
 - Workflow errors with “x’ is not a valid role or user name” error message
- Resource Manager enables group and Team members to receive Workflow notifications
 - This program synchronizes all attributes and records in the workflow wf_local_* tables with the mismatching records in Resource manager



Preferences

- Users can change the notification type preference via the preferences button
- Remove preferences button by setting profile option *General Preferences Show Flag* to No
- Changing global preference does NOT override preferences set individually

The screenshot shows the Oracle Self Service Workflow interface. The top navigation bar includes links for Diagnostics, Home, Logout, **Preferences** (highlighted with a red box), Help, and Personalize Page. Below the navigation bar, there are tabs for Home, Status Monitor, and Notifications. The main content area displays a welcome message for 'Stock, Pat' and a section titled 'Notifications'. This section contains a list of notifications with columns for From, Type, Subject, Sent, and Due. The 'Subject' column contains hyperlinks to specific notifications.

From	Type	Subject	Sent	Due
	PA Workplan Workflow	Workplan Version EC-100: Workplan VIII, 4 (EC-100, EC-100) published	03-Aug-2006	
Stock, Pat	PO Approval	Standard Purchase Order 3058 has been approved	06-Feb-2009	



Incorrect Preferences Cause Problems

- If users are not getting emails or emails display incorrectly, check the email style in the preferences
- If users choose summary email styles, the summary email notification must be scheduled in the mailer setup

The screenshot shows the Oracle Applications Preferences window. The 'Languages' section has 'Current Session Language' and 'Default Application Language' both set to 'American English'. The 'Accessibility' section has 'Accessibility Features' set to 'None'. The 'Regional' section has 'Territory' set to 'United States', 'Date Format' set to 'dd-MMM-yyyy (07-Feb-2009)', 'Timezone' set to '(GMT -08:00) Pacific Time', 'Number Format' set to '10,000.00', 'Currency' set to an empty field, and 'Client Character Encoding' set to 'Unicode (UTF-8)'. The 'Change Password' section has 'Known As' set to 'Pat Stock', and 'Old Password', 'New Password', and 'Repeat Password' fields are empty. The 'Start Page' section has 'Responsibility Page' set to an empty field. The 'Notifications' section has 'Email Style' set to 'Do not send me mail', which is highlighted with a red box. Below this, a note states: 'Notifications will be sent in your current default language, American English.'



Worklist Flexfields

- Allows display of attributes from message body in the notification worklist
 - Allows value to be seen without having to open the notification
 - Only Available Using Personal Worklist
- Specific to particular workflow therefore best used when creating special view for that workflow
- **What's great about this?**
 - Create personal worklist view to separate notifications by type
 - PO Approval more important than Invoice Approval so respond to these first
 - Create personal worklist view to see error messages



Worklist Flexfields - Create Flexfield Rule

- Example – Add the error text to the worklist
 - Workflow Administer creates flexfield rules
 - End Users can access the flexfields created
 - Click Create Rule to assign message attribute to flexfield

Worklist Flexfields Rules

Enter at least one of Rule Name, Display Name, Level or Workflow Type criteria.

Search

Rule Name	<input type="text"/>	Level	Any ▼
Display Name	<input type="text"/>	Workflow Type	Any ▼
Phase	<input type="text"/>	Message Attribute	<input type="text"/>
Status	Any ▼	Column Name	Any ▼
<input type="button" value="Go"/> <input type="button" value="Clear"/>			

Details	Rule Name	Display Name	Phase	Level	Status	Update
No search conducted.						



Worklist Flexfields - Create Flexfield Rule

- Name the rule and leave other attributes as shown

The screenshot shows the Oracle Worklist Flexfields Rule creation interface. The top navigation bar includes links for Diagnostics, Preferences, Help, Personalize Page, and Close Window. Below this is a progress bar with four steps: Enter General Properties (selected), Select Filter Criteria, Select Message Attributes, and Map Attributes to Columns. The main heading is "Create Worklist Flexfields Rule: Enter General Properties". A descriptive text states: "Determine in which order worklist flexfields rules take effect when more than one rule is applied to a notification. Lower phase rules are applied before higher phase rules." A "Cancel!" button and "Step 1 of 4" are visible. A blue callout bubble points to the "Next" button with the text "Click Next". The form fields are as follows:

- * Rule Name: WFERROR Item Type
- * Display Name: WFERROR Item Type
- Level: User
- Status: Enabled (dropdown)
- * Phase: 100
- Description: (empty text area)
- * Owner Name: Application Object Library
- * Owner Tag: FND

At the bottom right, there is a "Cancel!" button, "Step 1 of 4", and a "Next" button.



Worklist Flexfields - Create Flexfield Rule

- Select the System: Error workflow using display name



Worklist Flexfields - Create Flexfield Rule

- Select the message attributes you want to add to the worklist for the workflow chosen in step 2

Enter General Properties Select Filter Criteria **Select Message Attributes** Map Attributes to Columns

Create Worklist Flexfields Rule: Select Message Attributes

Identify Message Attributes to be duplicated in the notifications table and available for display in the Worklist. Cancel Back Step 3 of 4 Next

Selected Filter Criteria

Workflow Type	Type	Internal Name	Remove
System: Error		WFERROR	

Message Attributes

Message Attributes with the same Internal Name, Display Name and Data Type across multiple messages are displayed once.

Available Selected

Attribute Type: All Go

Error Activity ID (Number)

Error Activity Label (Text)

Error Assigned User (Text)

Error Item Key (Text)

Error Notification ID (Number)

Error Result Code (Text)

Error Type (Text)

Error User Key (Text)

Error name (Text)

Event Data URL (URL)

Move

Move All

Remove

Remove All

Error Item Type (Text)

Event Name (Text)

Error Message (Text)

Error Stack (Text)

Description: (Occurs in multiple messages)

TIP <Message Name> (<Internal Name>) appear in Description

TIP + indicates this Message Attribute exists in Multiple Messages



Worklist Flexfields - Create Flexfield Rule

- Map the message attributes to a mapped column based on data type (Text, date, etc...)
 - Click the Find Conflicts button to confirm no duplicate mappings

Enter General Properties Select Filter Criteria Select Message Attributes **Map Attributes to Columns**

Create Worklist Flexfields Rule: Map Attributes to Columns

Map message attributes to notification table attribute columns according to the message attribute type. Step 4 of 4

Display Name	Message Attribute Name	Type	Mapped Column	Remove
Error Item Type	ERROR_ITEM_TYPE	Text	TEXT_ATTRIBUTE1	
Error Message	ERROR_MESSAGE	Text	TEXT_ATTRIBUTE2	
Error Stack	ERROR_STACK	Text	TEXT_ATTRIBUTE3	
Event Name	EVENT_NAME	Text	TEXT_ATTRIBUTE4	

✓ **TIP** Multiple Message Attribute Display Name appear for Message Attributes with same Internal Name and Data Type across multiple messages.

Step 4 of 4



Worklist Flexfields - Create Personal Worklist View

- Use the Personalize button to create a new view

Worklist

View: Open Notifications **Personalize**

Select Notifications: 1-25

[Select All](#) | [Select None](#)

Select From	Type	Subject ▲	Sent	Due
<input type="checkbox"/>	OKL: CS Credit Memo	Approve Credit Memo Request for contract MAHLS07	06-Aug-2003	
<input type="checkbox"/>	OM Change Order	Change Approval Notification	08-Jun-2007	
<input type="checkbox"/> VCCONMGR	Contract Template Approval	Clauses Adopted for Vision France	24-May-2005	



Worklist Flexfields - Create Personal Worklist View

- Click the Rename Columns button to assign a name to the attributes created
- This will be the column name on the worklist

Original Column Name	New Column Name	Show Total
Subject	Subject	
From	From	
Sent	Sent	
Type	Type	
Status	Status	
To	To	
Information Requested From	Information Requested From	
Due	Due	
Closed	Closed	
Priority	Priority	
Notification ID	Notification ID	<input type="checkbox"/>
From Me	From Me	
Message Name	Message Name	
Type Internal Name	Type Internal Name	
Text_Attribute1	Errored Workflows	
Text_Attribute2	Error Message	
Text_Attribute3	Error Stack	



Worklist Flexfields - Create Personal Worklist View

- Limit the search to WFERROR workflows

Sort Settings

	Column Name	Sort Order
First Sort	Sent	descending
Second Sort	Errored Event	ascending
Third Sort		no sort order

Search Query to Filter Data in your Table

Specify parameters and values to filter the data that is displayed in your table.

Advanced Search

☒ Show table data when all conditions are met.
☐ Show table data when any condition is met.

Status	is	OPEN
Response Required	is	YES
Type Internal Name	is	WFERROR
Type Internal Name	is	
Subject	contains	Event

Add Another Subject Add

Cancel Revert Apply and View Results Apply



Worklist Flexfields - Sample Views for WFERROR

Worklist

View: **WFERROR by Event**

Select Notifications:

[Select All](#) | [Select None](#)

Select Errored Event	Subject	Sent	Error Message	Error Stack
<input type="checkbox"/>	oracle.apps.fnd.system.exception	09-Feb-2008	3142: Process 'OAM_BE/4456427' has no activities waiting to receive event 'oracle.apps.fnd.system.exception'.	Wf_Engine.Event(OAM_BE, 4456427, ALERT_PROC, oracle.apps.fnd.system.exception) Wf_Rule.Default_Rule (oracle.apps.fnd.system.exception, 2E0401490CAC44E25 OAM_BE, 4456190, system.exception) rule system.exception, 2E0401490CAC44E25 OAM_BE, 4456125, system.exception) rule system.exception, 2E0401490CAC44E25

Worklist

View: **WFERROR by Item Type**

Select Notifications:

[Select All](#) | [Select None](#)

Select Errored Workflows	Subject	Sent	Error Message	Error Stack
<input type="checkbox"/>	EPBCYCLE Error in Workflow EPBCYCLE/Netherlands Budget-2163-5-GENERATE_TEMPLATE-07/15/2005-14-33-49 OBA-01688: unable to extend table APPLSYS.WF_ITEM_ACTIVITY_STATUSES_H partition WF_ITEM22 by 16 in tablespace APPS_TS_TX_DATA	09-Feb-2008	ORA-01688: unable to extend table APPLSYS.WF_ITEM_ACTIVITY_STATUSES_H partition WF_ITEM22 by 16 in tablespace APPS_TS_TX_DATA	Wf_Engine_Util.Move_To_History(EPBCYCLE, Netherlands Budget-2163-5-GENERATE_TEMPLATE-07/15/2005-14-33-49, 628219) Wf_Engine_Util.Reset_Activities (EPBCYCLE, Netherlands Budget-2163-5-GENERATE_TEMPLATE-07/15/2005-14-33-49, 628219) Wf_Engine_Util.Reset_Activities (EPBCYCLE, Netherlands Budget-2163-5-GENERATE_TEMPLATE-07/15/2005-14-33-49, 628211) Wf_Engine_Util.Process_Activity (EPBCYCLE, Netherlands Budget-2163-5-GENERATE_TEMPLATE-07/15/2005-14-33-49, 628219, RUN) Wf_Engine_Util.Process_Activity (EPBCYCLE, Netherlands Budget-2163-5-GENERATE_TEMPLATE-07/15/2005-14-33-49, 628219, #NULL) Wf_Engine_Util.Execute_Activity (EPBCYCLE, Netherlands Budget-2163-5-GENERATE_TEMPLATE-07/15/2005-14-33-49, 628219, RUN) Wf_Engine_Util.Process_Activity (EPBCYCLE, Netherlands Budget-2163-5-GENERATE_TEMPLATE-07/15/2005-14-33-49, 628219) Wf_Engine_Util.ProcessDeferredEvent (EPBCYCLE)



OAM vs Workflow Administration

- OAM Workflow Page
 - Use to monitor the workflow system as a whole
 - Research all errors
 - Drill down to workflow type and process
 - Set up mailer
 - Monitor Agents and Queues
- Workflow Administration Menus
 - Troubleshoot specific errors
 - Troubleshoot specific notifications



OAM – Workflow Page

ORACLE Applications Manager Support Cart Setup Home Logout Help

Applications Dashboard | [Site Map](#)
Applications System: a120int1 >
[Workflow Metrics](#) [Related Links](#)
Workflow System: a120int1
Last Updated: 08-Feb-2009 20:59:37

Notification Mailers Up

Agent Listeners Up

Service Components Up

Background Engines Up

Purge Up

Control Queue Cleanup Up

Submit Request For: Background Engines

Go

Related Database Parameters
Last Updated: 08-Feb-2009

Parameter Name	Parameter Value	Recommended Value	Description
job_queue_processes	10	10	number of job queue slave processes
aq_tm_processes	1	>= 1	number of AQ Time Managers to start

Workflow Metrics [Return to Top](#)

Work Items
[Show](#)

Agent Activity
[Show](#)




Related Links [Return to Top](#)








Configuration
[Service Components](#)
[Queue Propagation](#)

Throughput
[Work Items](#)
[Agent Activity](#)
[Notification Mailers](#)



OAM Dashboard

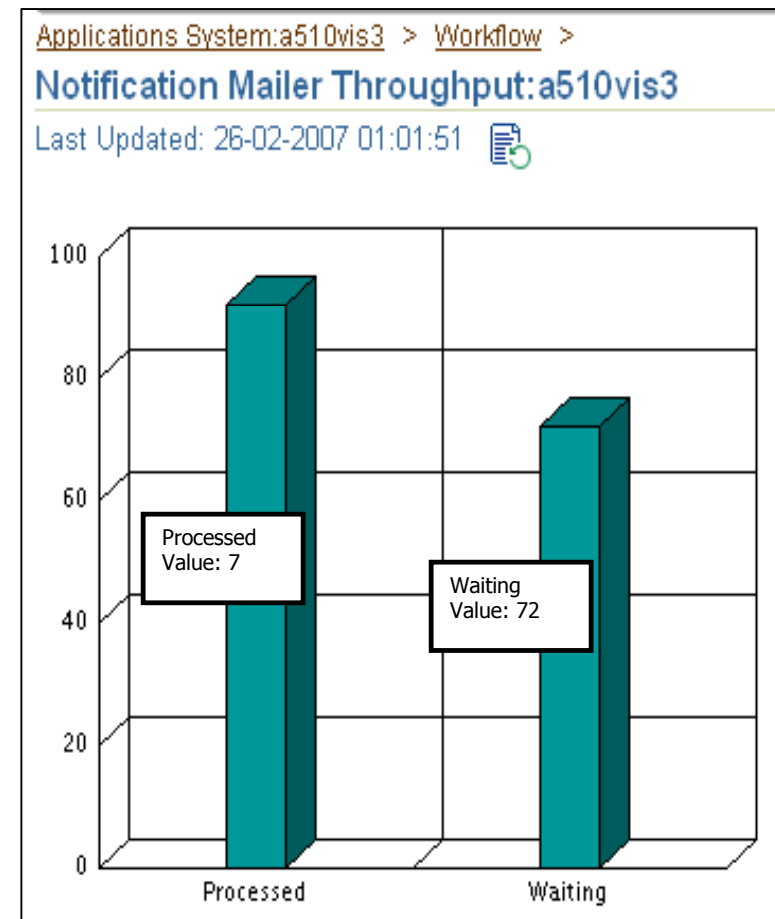
- Notification mailer will not show  if notification mailer is not activated
 - Notifications still appear in worklist
- All other icons should be green
 - Background Engines, Purge and Control Queue Cleanup show  if concurrent requests scheduled
 - If Mailer is down, Service Components will be , must click to check if issues with other listeners

Workflow System: a121int3	
Last Updated: 17-Aug-2011 23:30:00 	
Notification Mailers  Down	Background Engines  Up
Agent Listeners  Up	Purge  Up
Service Components  Down	Control Queue Cleanup  Up
Submit Request For <input type="text" value="Background Engines"/> <input type="button" value="Go"/>	




OAM – Throughput

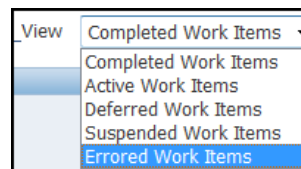
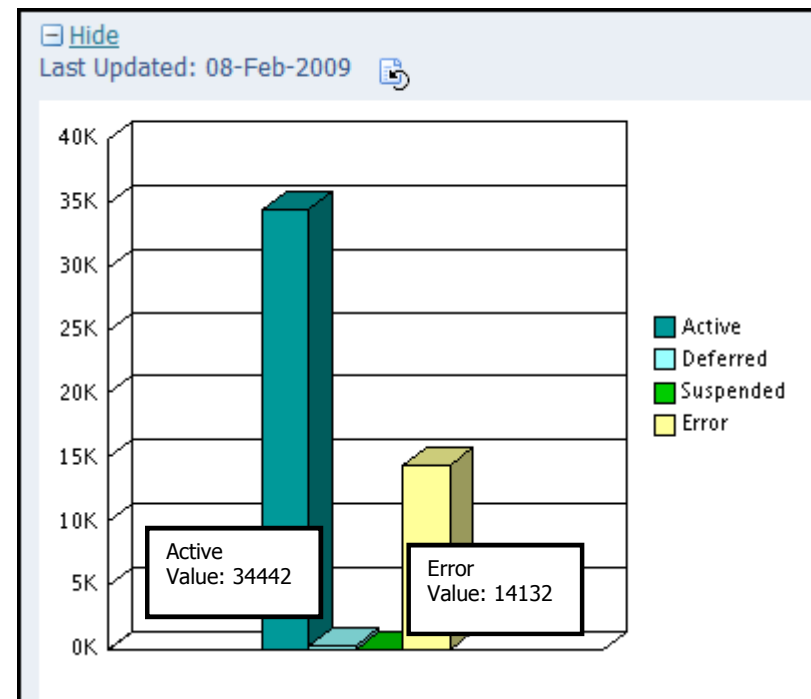
- If mailer is down, notifications waiting will continue to grow
 - Common in cloned environments
 - See workflow book for proper cloning steps
- Processed
 - STATUS = OPEN
 - MAIL_STATUS = SENT
- Waiting
 - MAIL_STATUS = MAIL





OAM – Work Items

- Hovering mouse over bar yields exact count
 - Active includes errored processes
- Click on bar to drill down
 - Drill down also available by clicking on  (or **X**) next to Purge in dashboard section and selecting view





OAM – Work Items Drill down

- Shows errored work items by item type
 - Workflow types with high error counts most likely indicate a problem in the process

Errored Work Items: a120int1 View **Errored Work Items** Go

Filter Work Item Type Contains

Last Updated: 05-Feb-2008

Select a work item type and ... View Details Previous 1-15 of 73 Next 15

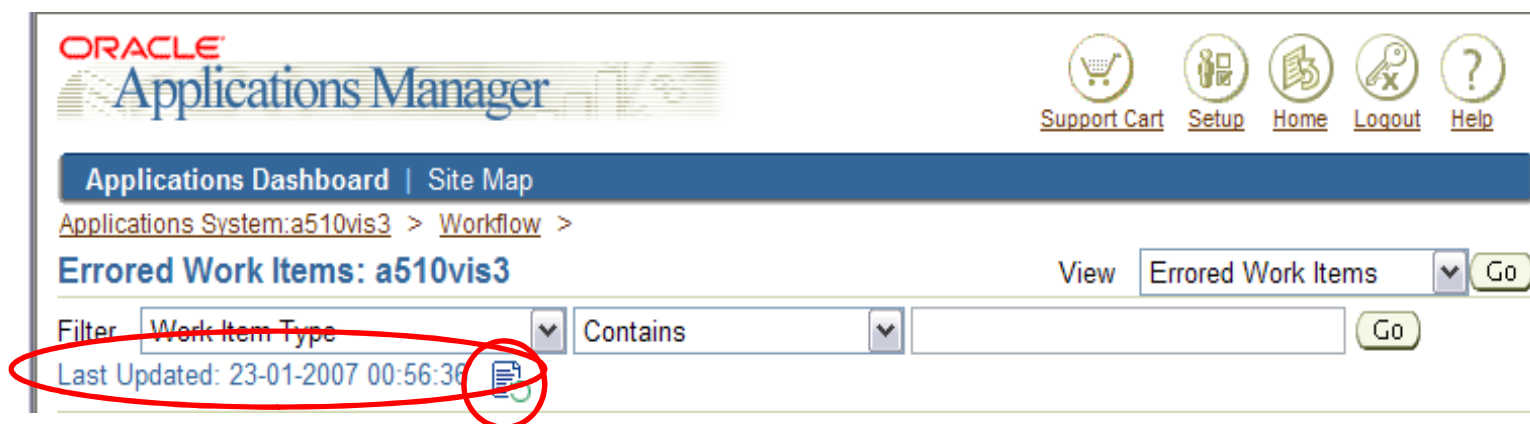
Select Work Item Type ▲	Count
<input checked="" type="radio"/> ADS HR Custom Workflows	2
<input type="radio"/> ADS Sales Notification	749
<input type="radio"/> AMS Marketing Approvals	9
<input type="radio"/> AMS: List Generation	10
<input type="radio"/> AP Invoice	103
<input type="radio"/> AP Procurement Card Employee Verification Workflow	2
<input type="radio"/> Address Change	28

Click on item type hyperlink to drill down further



Tips – Refresh Button

- OAM forms do not perform new queries (unless refresh button is pressed)
 - Schedule the following programs for refresh
 - Workflow Agent Activity Statistics concurrent Program
 - Workflow Mailer Statistics Concurrent Program
 - Workflow Work items Statistics Concurrent Program





OAM – Work Items Drill down

- Shows process in error for item type

Errored Work Items: a120int1 View Errored Work Items Go

Stage Summary: AP Invoice

Filter Start Date within last __ days Go

Last Updated: 08-Feb-2009 21:25:18

Select a work item activity stage and ... View Details

Select Work Item Activity Stage ▲	Count
<input checked="" type="radio"/> APINV IA	103

Default is 30 days

Click on process name hyperlink to drill down further



OAM – Work Items Drill down

- Shows specific workflows in error for specific process
 - Abort All and Retry All buttons unique to OAM

Errored Work Items: APINV_IA: a120int1 View Errored Work Items Go

Filter Activity Name Go

Last Updated: 08-Feb-2009 21:27:02

Abort All Retry All

Select Activity and ... Abort Retry Launch Workflow Monitor Previous 1-15 of 103

Select Activity Name ▲	Start Date	Due Date	Assigned User	Item Key
<input checked="" type="radio"/> APINV_IA	20-Sep-2004 07:18:33			83994_1
<input type="radio"/> APINV_IA	20-Sep-2004 07:18:33			84111_1
<input type="radio"/> APINV_IA	20-Sep-2004 07:18:34			

Select workflow and launch workflow monitor
--Same as admin menus



OAM – Work Items Drill down

Activity History
Status Diagram
Participant Responses
Workflow Details

Status Diagram: APINV, 83994_1

Workflow Type **AP Invoice** Started **20-Sep-2004 07:18:33**
Status **Error** Completed

Current Status

✓ TIP Status Diagram Time Zone Central Time

Zoom In Zoom Out

Also includes links to Activity History, Participant Responses and Workflow Details
--Also in admin menus

```
graph LR; A[Receive Invoice] --> B[Check if Matched to PO]; B -- No --> C[Identify Approver]; B -- Yes --> D[Send Notifications]; C --> E[Update Approval History]; E --> C; C --> F[Approve]; F --> D;
```

Definition Usage Status Notification

Current Location : Invoice Approval - Main/Invoice Approval - Main
Item Type : AP Invoice
Activity Name : Invoice Approval - Main
Description :
Activity Type : Process
Result Type :



Activity History Link

Monitor Activities History

Activity History: GLBATCH, 2930184*828, JE Approval Example 17-AUG-2011 23:40:31

View Process Hierarchy

[Expand All](#) | [Collapse All](#)

Focus Process Name	Status	Workflow Type	Item Key	User Key	Owned By	Started	Completed
GL Journal Approval Process	Active	Journal Batch	2930184*828 JE Approval Example	17-AUG-2011 23:40:31	Stock, Pat	17-Aug-2011 23:41:20	

Workflow Type: **Journal Batch** Started: **17-Aug-2011 23:41:20**
Status: **Active** Completed

Search

Set activity filters and select the "Go" button to view corresponding results.

Activity Type: ☒ Response Notifications ☒ FYI Notifications ☒ Functions and Processes ☒ Standard Workflow ☒ Events

Activity Status: ☒ Active ☒ Complete ☒ Error ☒ Suspended

Results: Activities

✓ TIP You can administer an activity only if it's still in process.

Select Activity and...

Previous 1-10 Next 10

Select	Status	Activity	Parent Activity	Notification	Performer	Started	Completed	Activity Result	Reassign	Suspend / Resume
<input type="radio"/>	Notified	Request Approval From Approver	GL Request Approval Process	Open	Brown, Casey	17-Aug-2011 23:41:22				
<input type="radio"/>	Complete	Is Approver the Direct Manager?	GL Request Approval Process			17-Aug-2011 23:41:22	17-Aug-2011 23:41:22	Yes		
<input type="radio"/>	Complete	Is This the First Approver?	GL Request Approval Process			17-Aug-2011 23:41:22	17-Aug-2011 23:41:22	Yes		

Click notification status link to view and respond (if Open) to notification

Select	Status	Activity	Parent Activity	Notification	Performer	Started	Completed	Activity Result	Reassign	Suspend / Resume
<input type="radio"/>	Notified	Request Approval From Approver	GL Request Approval Process	Open	Brown, Casey	17-Aug-2011 23:41:22				



Activity History Activity Section

- Participant Responses – view list of all notification activity and status

Monitor Responses

Notification List: GLBATCH, 2930184*828, JE Approval Example 17-AUG-2011 23:40:31

View Process Hierarchy

[Expand All](#) | [Collapse All](#)

✦

Focus	Process Name	Status	Workflow Type	Item Key	User Key	Owned By	Started	Completed
	GL Journal Approval Process	✓ Complete	Journal Batch	2930184*828	JE Approval Example 17-AUG-2011 23:40:31	Stock, Pat	17-Aug-2011 23:41:20	17-Aug-2011 23:54:10

Workflow Type **Journal Batch** Started **17-Aug-2011 23:41:20**
Status **Complete** Completed **17-Aug-2011 23:54:10**

Search

Set activity filters and select the "Go" button to view corresponding results.

☒ Response Notifications
☐ FYI Notifications
☒ Closed Notifications

Notification List

Activity	Notification Subject	Recipient	Comment	Notification Response	View Response Details
Request Approval From Approver	Journal batch JE Approval Example 17-AUG-2011 23:40:31 requires your approval.	Brown, Casey		Approve	

Click on the notification icon to see response details



Activity History Activity Section

- Participant response detail including any notes
 - Also available from Participant Responses link

Notification Response Details	
Notification Response Details	
Notification Subject	Journal batch JE Approval Example 17-AUG-2011 23:40:31 requires your approval.
Respondent	Stock, Pat
Original Recipient	Brown, Casey <small>If different from "Respondent", the original recipient delegated responsibility for replying to the respondent.</small>
Notification Sent	17-Aug-2011 23:41:23
Response Received	17-Aug-2011 23:54:09
Response	Approve
Signature Details	
This notification did not require a signature.	
Additional Response Information	
This notification asked the respondent to provide the following information. Some or all fields may be blank.	
Comment	



Activity History Hierarchy Section

- Expand the list to show child workflows

Activity History: APINV, 83994_1

View Process Hierarchy

[Expand All](#) | [Collapse All](#)

✚

Focus	Process Name	Status	Workflow Type	Item Key	User Key	Owned By	Started	Completed
<input type="checkbox"/>	Invoice Approval - Main	Error	AP Invoice	83994_1			20-Sep-2004 07:18:33	
	Default Error Process	Complete	System: Error	WF119723			20-Sep-2004 07:18:33	25-Jan-2006 04:16:52

Click the Error hyperlink to get the full error stack

- Click the process name hyperlink to show activity history for the child workflow



Workflow Details Link

- Workflow attributes
 - Shows all values related to the workflow process including error messages
 - Partial list shown here
- Workflow administrator can edit attributes and rewind/restart process

Workflow Attributes	
Batch ID	2930184
Batch Name	JE Approval Example 17-AUG-2011 23:40:31
Budgetary Control Status	N
Batch Balance Type	A
Batch Control Total	
Batch Running Total Credit	50000
Batch Running Total Debit	50000
Batch Period Name	Dec-12
Ledger ID	-1
Functional Currency	USD
Budgetary Control Flag	N
Consolidation Ledger flag	N
Suspense Allowed Flag	Y
Average Balances Flag	N
Automatic Tax Flag	N
Latest Encumbrance Year	2008
Total Batch Amount	50000
Preparer ID	25
Preparer's AOL User ID	1318
Preparer AOL User Name	OPERATIONS
Preparer Display Name	Stock, Pat
Preparer Name	OPERATIONS
Responsibility ID of preparer	50553
Approver ID	31
Approver AOL User ID	
Approver Display Name	Brown, Casey
Approver Name	CBROWN
Manager ID	31
Manager Display Name	Brown, Casey
Manager Name	CBROWN



Workflow Administration

- Troubleshooting tools are in Status Monitor and Administration tabs

ORACLE® Administrator Workflow

Home | Developer Studio | Business Events | **Status Monitor** | Notifications | **Administration**

Logged In As **OPERATIONS**

Welcome Stock, Pat
to Oracle Workflow

Notifications at a Glance

Below is a list of your most important notifications. Select the subject to respond or select "Full List" to see all your notifications. [Full List](#)

Switch User

From	Type	Subject	Sent	Due
	Journal Batch	Brown, Casey approved your journal batch JE Approval Example 17-AUG-2011 23:40:31.	17-Aug-2011	
Stock, Pat	PO Approval	Standard Purchase Order 6034 has been approved	16-Aug-2011	
Stock, Pat	PO Approval	Standard Purchase Order 6027 has been approved	04-May-2011	
Brown, Casey	PO Approval	Standard Purchase Order 5946 has been approved	13-Feb-2008	
Brown, Casey	PO Approval	Standard Purchase Order 5942 has been approved	13-Feb-2008	

TIP [Vacation Rules](#) - Redirect or auto-respond to notifications.
TIP [Worklist Access](#) - Specify which users can view and act upon your notifications.



Workflow Administration - Status Monitor

- Search for specific workflows here
 - Activity history, status diagram, participant responses and workflow detail same as OAM

Monitor Search

Workflows

Search

Select "Show More Search Options" to search for workflows by activity characteristics.

Workflow Type

Type Internal Name
(Example: WFDEMO, WFEROR)

Workflow Owned By

Item Key

User Key

* Workflow Status

* Workflow Started

[Show More Search Options](#)

Results: Workflows

To view or administer a workflow, select "Activity History" to view workflow activity, "Status Diagram" to view the workflow diagram, "Participant Responses" to view comments and other information gathered for closed, response-required notifications.

TIP Workflow histories are periodically purged from the system and may no longer be available for review.

Select Workflow and View... **Activity History** **Status Diagram** **Participant Responses** **Workflow Details** 1-25

Select	Status	Workflow Type	Item Key	Process Name	User Key	Owned By	Started	Completed	Child Workflows
<input type="radio"/>	<input checked="" type="checkbox"/>	Error @AP Invoice Approval	155960_1	Main Approval Process			01-Nov-2007 14:36:07		
<input type="radio"/>	<input checked="" type="checkbox"/>	Error @AP Invoice Approval	155958_1	Main Approval Process			31-Oct-2007 15:54:00		
<input type="radio"/>	<input checked="" type="checkbox"/>	Error AP Invoice	84516_1	Invoice Approval - Main			20-Sep-2004 11:51:57		

Need invoice id

Look for items in error



Workflow Administration - Administration

- Notification search in this window allows search for notifications for others

Home | Developer Studio | Business Events | Status Monitor | Notifications | **Administration**

Workflow Configuration | Vacation Rules | **Notification Search** | Signature Evidence Store

Notifications
Enter filter criteria such as Notification ID, Owner, To, From, Workflow Type, Type Internal Name, Subject
* Indicates required field

Search

Notification ID
Find the Notification matching this Notification ID only, other search parameters will be ignored

Owner All Employees and Users

To All Employees and Users Stock, Pat

From All Employees and Users

* Status Open

Workflow Type

Type Internal Name

Subject

* Sent Date Any Time

* Due Date Any Time

* Priority All

Select Notifications:

[Select All](#) | [Select None](#)

Select From	Type	Subject	Sent	Due	End Date
<input type="checkbox"/>	XXHR Validate New Employee	Please set up the email address for Bowen, Mrs. Carol and enter it below	07-Feb-2009	08-Feb-2009	



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WORKFLOW TROUBLESHOOTING FOR DEVELOPERS AND DBAS



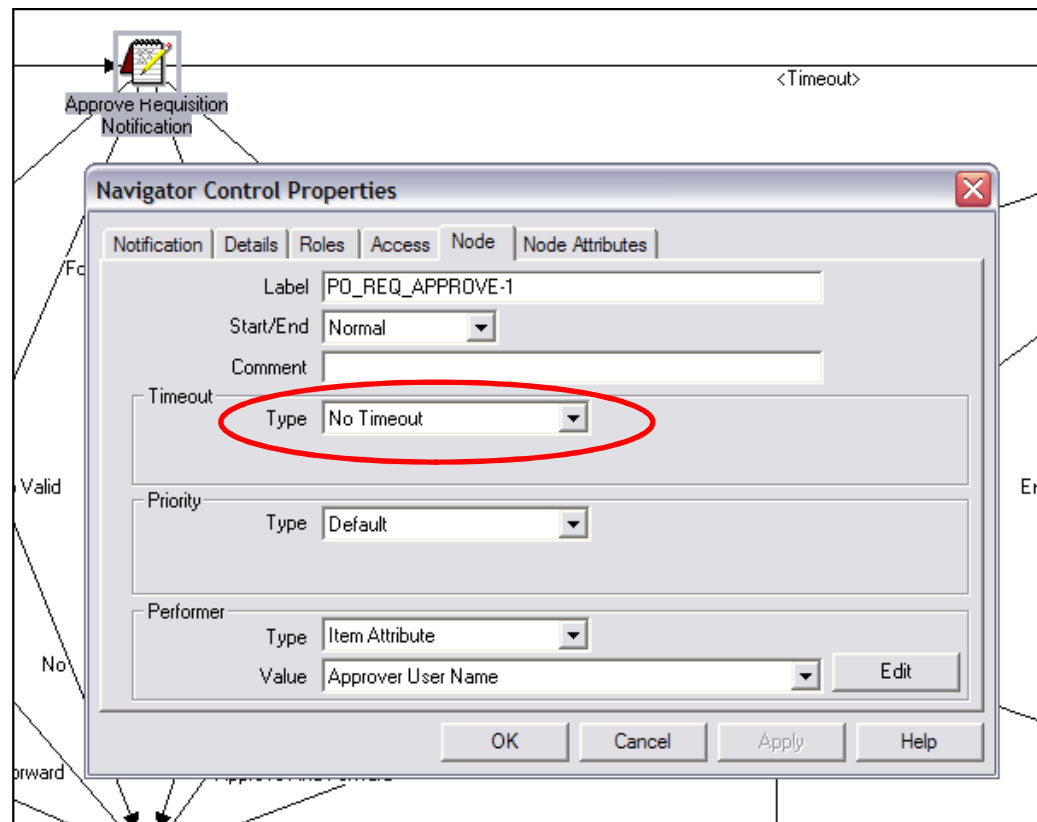
Overview

- My Oracle Support Notes
 - 378287.1 or 1320509.1 – “Latest ATG News”, “E-Business Workflow Information Center”
 - 461431.1 – "Script to Check What Workflow Related Patches Are Installed in EBusiness Suite R12"
 - One-offs not usually included
 - 336843.1 or 275379.1 – "Oracle Workflow Diagnostic Script wfreleases.sql (Release 11i)", "Script to Check What ATG/Workflow Related Patches Are Installed In EBusiness Suite"
 - Includes very few one-offs
 - 342459.1 – “E-Business Support Diagnostics Overview”
 - Click 'R12 Catalog' or '11i Catalog' to get current list of Diagnostics
 - 135266.1 – "Oracle HRMS Product Family – Release 11i and 12 Information"
 - HR patches are important for valid Directory Services functionality even when only running shared HR



Workflows MUST be configured

- Timeouts
- Example – REQAPPRV
- Timeout not defined





Workflows MUST be configured

- Performers
 - Example – APEXP
 - Who is informed if rejected

The image shows a workflow diagram on the left and two 'Navigator Control Properties' dialog boxes on the right.

Workflow Diagram: A flow starts with a decision node (blue circle with a question mark) labeled 'Expense Report Has Been Payables Reviewed'. One path leads to a task node (envelope icon) labeled 'Inform AP Expense Report They Reviewed Is Mgr Rejected'.

Left Navigator Control Properties Dialog:

- Tab: Details
- Label: INFORM_AP_MANAGER_REJECTED
- Start/End: Normal
- Comment: (empty)
- Timeout: Type No Timeout
- Priority: Type Default
- Performer: Type Item Attribute, Value AP

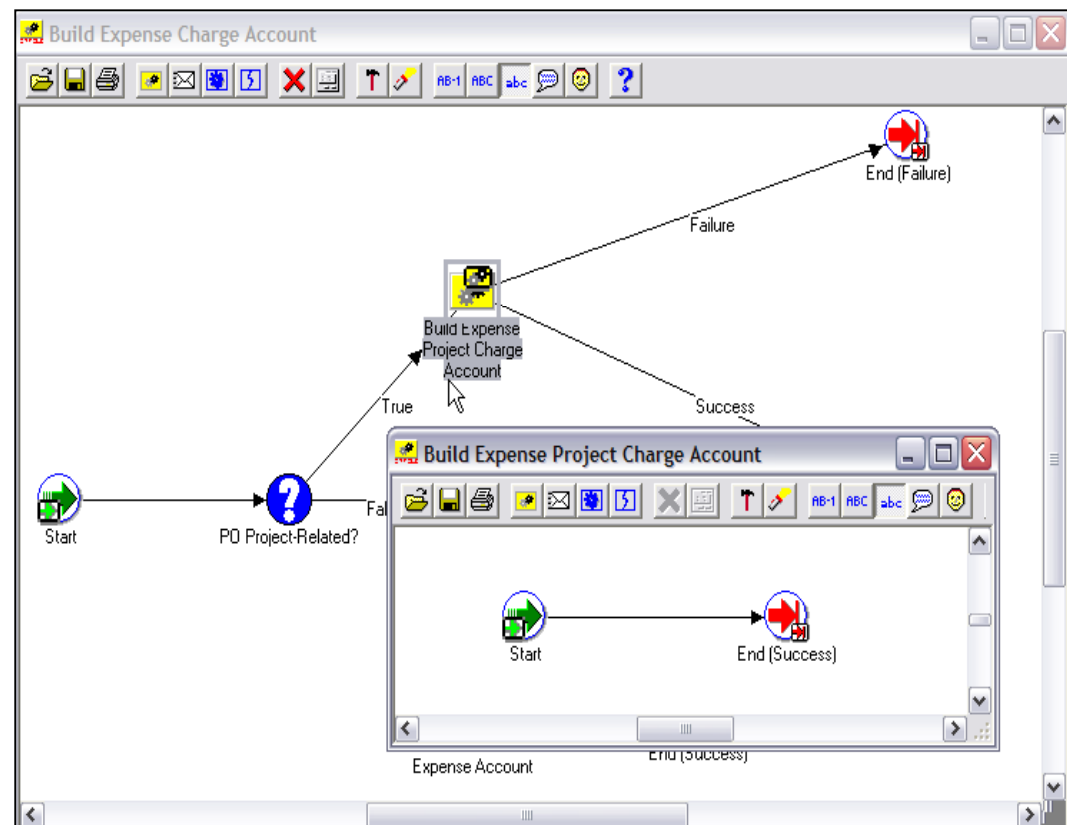
Right Navigator Control Properties Dialog:

- Tab: Access
- Item Type: Expenses
- Internal Name: PAYABLES
- Display Name: AP
- Description: Payables
- Type: Role
- Default: Type Constant, Value <None> (circled in red)



Workflows MUST be configured

- Account Generators
 - If Using Projects, MUST customize POWFPOAG, POWFRQAG, PAAPINVW





Workflows MUST be configured

- Attributes
 - Example – CREATEPO, POERROR
 - Auto Create Allowed
 - Auto Approval Allowed
 - Is contact required





Workflow Performance

- OAUG Conference Paper Database - 2011
 - Workflow Performance Tuning in Release 12
 - Replace slide recommending parameters for SYSADMIN with a recommendation to “Change Framework User from SYSADMIN to User Dedicated to running the Mailer”
 - See next Slide for explanation



Workflow Mailer

- Mailer User
 - Must be a workflow administrator
 - Will force administrator to be a responsibility
 - Should have following responsibilities only
 - System Administrator
 - Responsibility used as workflow administrator
 - Should not be a user with other duties
- Why not SYSADMIN
 - Performance: SYSADMIN usually has too many of own emails due to WFERROR emails
 - Manageability: Enabling log for SYSADMIN includes many other functions than mailer thus hampering troubleshooting



Workflow Mailer

- Do NOT sign into Mailer email account to monitor activity (marks emails as read, won't go to EBS)
- If using inbound, use the Test Mailer functionality to ensure both types of messages can be processed
- Cloned instances
 - Cannot share same inbound mailer account
 - Cloned instance will “steal” emails from production
 - Use Override Notification Mailer Address
 - If shut down mailer, change mailer preferences globally and for individual users
 - Stored in FND_USER_PREFERENCES

```
UPDATE fnd_user_preferences
SET preference_value = 'QUERY'
WHERE preference_name = 'MAILTYPE'
AND preference_name != 'QUERY';
```



Queries for Error Message From Errored Activity

```
SELECT   wiasv.item_type
        ,wpa.process_name || ' : ' ||
          wiasv.activity_label activity
        ,wiasv.item_begin_date ,wiasv.item_end_date
        ,wiasv.activity_begin_date
        ,wiasv.activity_end_date ,wiasv.item_key
        ,REPLACE (wiasv.error_message, CHR(10), '; ')
          error_message
        ,REPLACE (wiasv.error_stack, CHR(10), '; ')
          error_stack
FROM wf_item_activity_statuses_v wiasv
     ,wf_process_activities wpa
WHERE wiasv.activity_id = wpa.instance_id
      AND wiasv.error_message IS NOT NULL
      AND wiasv.activity_status_code = 'ERROR'
ORDER BY 1 ASC, 2 ASC, 3 DESC;
```



Queries for Error Message From WFERROR – Errored Item Type

```
SELECT      Wf_Notification.GetAttrText(notification_id,  
            'ERROR_ITEM_TYPE') errored_workflow  
            ,Wf_Notification.GetAttrText(notification_id,  
            'ERROR_ACTIVITY_LABEL') errored_activity  
            ,begin_date sent  
            ,REPLACE (subject, CHR (10), '; ') subject  
            ,REPLACE (Wf_Notification.GetAttrText(notification_id,  
            'ERROR_MESSAGE'), CHR (10), '; ') error_message  
            ,REPLACE (Wf_Notification.GetAttrText(notification_id,  
            'ERROR_STACK'), CHR (10), '; ') error_stack  
FROM wf_notifications  
WHERE MESSAGE_TYPE = 'WFERROR'  
      AND message_name = 'RESET_ERROR_MESSAGE'  
      AND status = 'OPEN'  
ORDER BY 1 ASC, 2 ASC, 3 DESC;
```



Queries for Error Message From WFERROR – Errored Event

```
SELECT    Wf_Notification.GetAttrText(notification_id,  
          'EVENT_NAME') error_event  
          ,Wf_Notification.GetAttrText(notification_id,  
          'EVENT_KEY') event_key  
          ,begin_date sent  
          ,REPLACE (Wf_Notification.GetAttrText(notification_id,  
          'ERROR_MESSAGE'), CHR (10), '; ') error_message  
          ,REPLACE (Wf_Notification.GetAttrText(notification_id,  
          'ERROR_STACK'), CHR (10), '; ') error_stack  
FROM      wf_notifications  
WHERE     MESSAGE_TYPE = 'WFERROR'  
          AND message_name = 'DEFAULT_EVENT_ERROR'  
ORDER BY  1 ASC  
          ,3 DESC;
```



Summary

- Workflow is for everyone
- Everyone benefits from
 - Better information
 - Smoother performance
 - Less errors, reduced frustration, increased throughput
 - Enablement to perform assigned tasks
 - Increased efficiency
 - Happier Employees
 - Reduced turnover
 - Lower costs

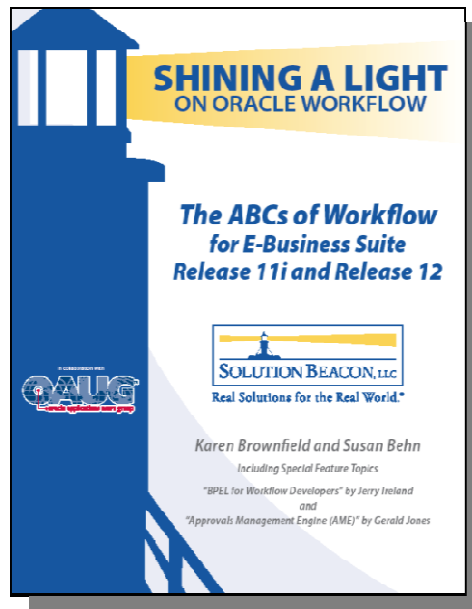


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Release 12 Books by Rolta Employees



**The ABCs of Workflow for
Oracle E-Business Suite
Release 11i and Release 12**



**The Release 12 Primer –
Shining a Light on the
Release 12 World**

**Available from Amazon.com,
Barnes & Noble (bn.com)
Lulu.com**



Questions?

Thank You !



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