

Approvals Series – EBS Approvals Communication and History

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Introduction to the Explorer Series

Since 2011 the Special Interest Groups have collaborated on presentations focused on a single threaded topic to allow conference attendees to participate in end-to-end business scenarios designed to stimulate conversation and educate end users.

This paper is part 3 of 4 of the Approvals Series. The other parts are:

- Approvals Series Part 1– EBS / Cloud: Key Concepts and Terms
- Approvals Series Part 2– EBS Approvals List Creation, Limits, and Rules
- Approvals Series Part 4– Approvals in Cloud – New and Improved

Introduction to EBS Approvals Communication and History

Part 2 of the series ‘EBS Approvals List Creation, Limits, and Rules’, covered basically how we can build a list of approvers in EBS. This presentation will focus on how we communicate an approval requirement to those approvers in EBS. Approvals rely on Workflow Notifications functionality.

To start with will cover some Workflow Notifications fundamentals. We will expand out to include some recent enhancements like the EBS Mobile Approvals App. This paper will wrap up with a review of some potential issues related to Approvals history retention and some ways around this.

Workflow Notifications

Workflow Notifications come in two basic types:

FYI Notifications

These Notifications contain some information or details for the user to be aware of. We will not cover these in this paper.

Response Required Notifications

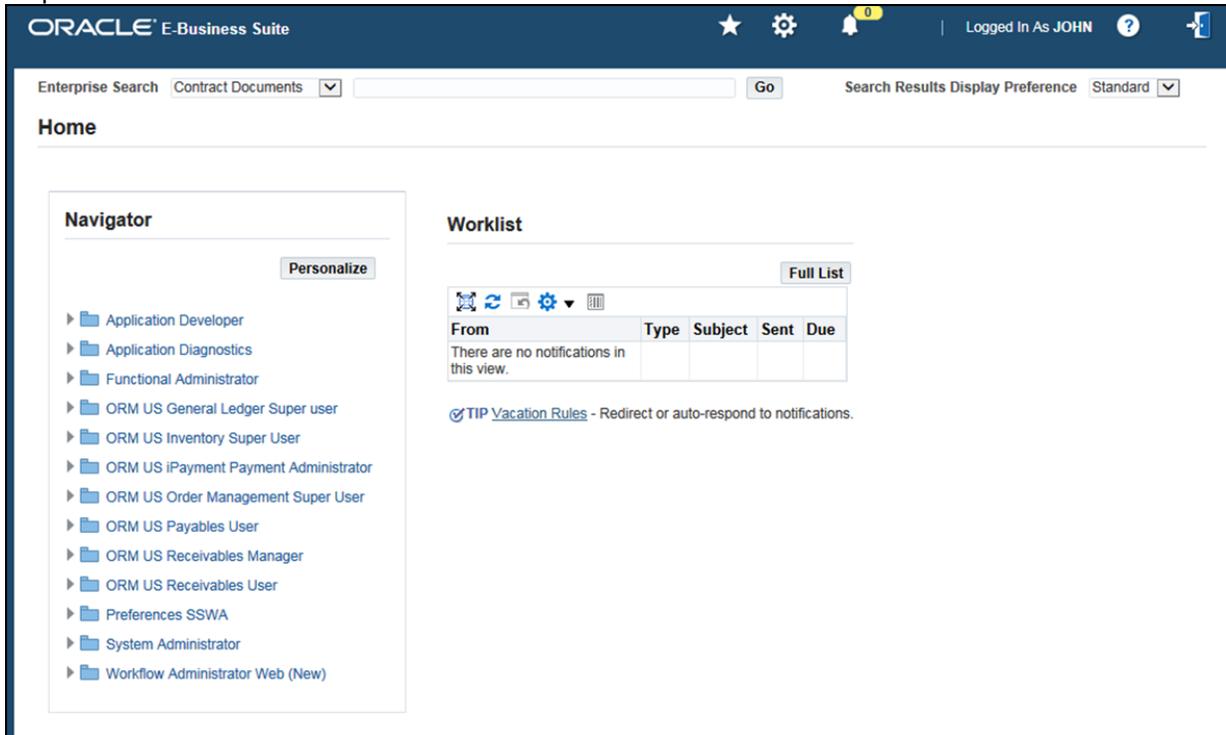
These Notifications contain some information and require a response from the user. The response comes from a list of values. The list of values are static values assigned in the Workflow Builder. This is a requirement because based on a given response the workflow process might need to branch and if we don't have a fairly static set of values you would not be able to define the process flow properly.

Users can request additional information from the person that originally submitted the approval request. They can optionally forward the notification to another user, or Transfer or Delegate approval authority to another user. User and Administrators can setup vacation rules to automatically control this Transfer or Delegate capability by Item Type and Approval Type.

When a Response Required notification is sent the date/time that it was sent is recorded in the workflow. This allows for a notification to Timeout and depending upon how the workflow process was written escalate up to another approver, or set a default response. The Timeout value is usually assigned in the

Workflow Builder, but can be set using attributes or variables that allow an end user to determine the correct value. This really depends upon how the workflow process was developed. Even if the Timeout value is user definable, it cannot be retroactively changed on a notification that has already been sent. The notification knows when it was sent and the timeout date/time has been established for that specific notification.

Notifications typically show up in the users Worklist within EBS. In R12.2 a Bell icon on the top navigation bar will link to the Worklist. Also a yellow ellipse will contain the number of notifications the user currently has in the Worklist that they need to review. An additional icon show up on this navigation bar if a user has been delegated as an approver by another user so they can switch to that user to review and respond to notifications.



Notifications can also be sent to the user through email, if the Notification Mailers have been configured in your EBS instance and the Notification Style has been set. The administrator can set a Global Preference for the Notification Style that is the initial default for all users. This is set using the responsibility: 'Workflow Administrator Web (New)', navigation path: Administration : Workflow Configuration : Global Preferences. See the screen shot below.

Enter the Workflow Business Event System Name and System Processing Status.

* System Name

This is the system name of the database where this instance of Oracle Workflow is installed.

* Status

Global Preferences

The following preferences are set as default values for all new users.

* Notification Style regardless of which Notification Style is selected.

Browser Signing DLL Location

Workflow Status Monitor Diagram

* Workflow Status Monitor Diagram Size

Notification Response

Defer Notification Response Processing for Item Types All - All Item Types. None - No Item Types. Specific - Choose Item Types.

Users can change their preferred Notification Style by clicking on the Gear icon in the top navigation bar. Scroll down to Notifications and pick a style. This is a common reason why users do not receive email notifications in their instance is that they have inadvertently set this to a value of 'Do not send me mail' or 'Disabled'.



TIP Please enter your old and new passwords. Passwords are case sensitive.

Delivery Manager e-mail server credentials

e-Mail username

e-Mail password

Start Page

Responsibility

Page

Notifications

Email Style Language, American English.

The selection of Notification Styles are:
 Disabled
 Do not send me mail

- HTML mail
- HTML mail with attachments
- HTML summary mail
- Plain text mail
- Plain text mail with HTML attachments
- Plain text summary mail

The most common setting these days is 'HTML mail with attachments', but based on your email tool and environment you might want to try out these different options to see which one works best for you.

See the following two My Oracle Support Notes for details on setting up the notification mailer and setting the notification style.

Workflow Java Mailer & Notifications FAQ (Doc ID 562551.1)

Workflow Notification Email Preference is Disabled: How to Troubleshoot and Repair (Doc ID 1326359.1)

Notifications can also be digitally signed. This is sometimes required by government regulations, like the FDA to ensure that who is responding is really the user the email was sent to. There are two forms of digital signature supported in EBS:

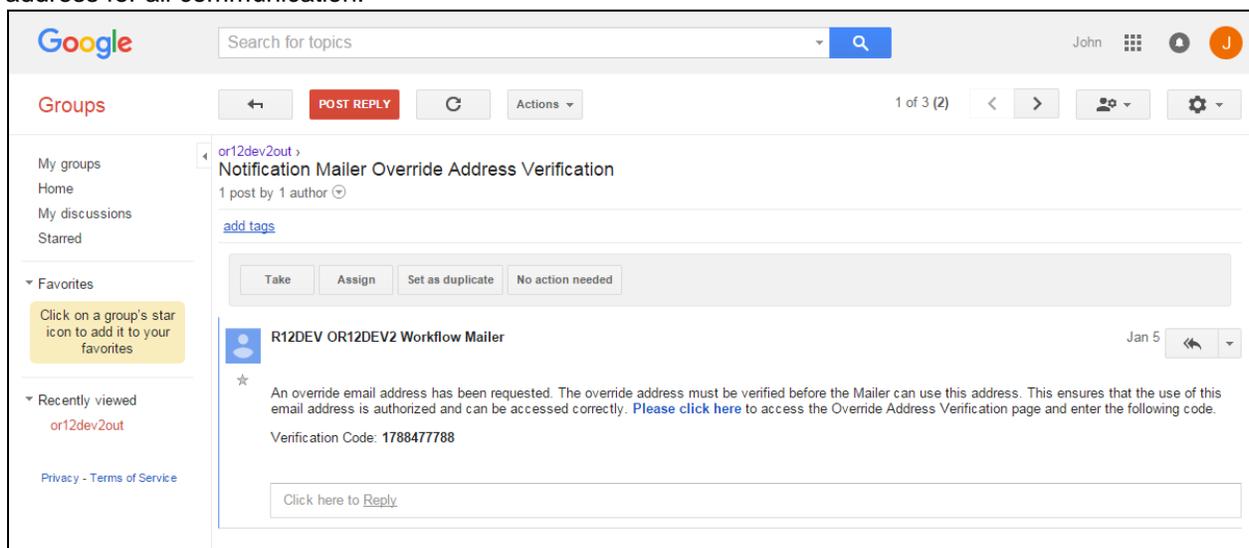
Password-Based Signature - user is prompted to enter their EBS password

Certificate-Based Digital Signature - a certificate is stored on the users computer and referenced to verify the user

I will not be going into details on digital signatures because this is a complex and rarely used feature of EBS but I wanted to at least point out that it exists.

Workflow Notifications in non-PRODUCTION environments are very import to configure and test. This is the only way you can verify that patching and configuration changes have not broken email notification functionality. Also you don't want non-PRODUCTION notifications being sent to users, vendors and customers and confusing them. Nothing in the notification identifies which EBS environment the notification was sent from. You can sometimes infer this from the From email address, but that is often not obvious to the recipient of the notification.

Luckily EBS has a Notification Mailer Override Email Address feature. Setting this parameter will redirect emails to a common email box so we can keep them separate by environment. When you setup the Override Email Address you must respond to an email to verify that you intended to use that email address for all communication.



I would not combine environments into one mailbox, keep separate values for DEV and TEST. You can then grant all non-PROD testers access to this mailbox so they can review and respond to notifications. This is also really handy when setting up a complicated approval process because you can see who the notification was originally sent to in the To address, and you can reply to the notification as though you were that individual allowing the approval process to progress. You must also ensure that you have configured a separate INBOX for the notification mailer to process responses out of. I would also strongly recommend that you use a web based mail provider for this, like GMAIL for two reasons:

- 1) It is completely separate from your production email environment, and it would be difficult for users to get confused.
- 2) You don't want mail volume being an issue in your production email environment.
- 3) Since this is just test data security requirements are not too high

Take a look at the following two My Oracle Support Notes for details on setting up the Notification Mailer Override Email Address and also using web mail services.

How Does One Set Oracle Workflow Override Address After A Clone. (Doc ID 1623032.1)

Configuring Oracle E-Business Suite Workflow Mailer with TLS for Microsoft Office365, Gmail, or Cloud Based Email Services for 12.1.3 and 12.2 (Doc ID 2051827.1)

Notification Changes

Like most things that come seeded with EBS, workflow notifications provide you about 75% of what you might need when approving a request. Based on your business requirements it is often advantageous to simplify an approval process by adding additional details to the workflow notification. The most common notification change is to add data elements to the notification so the approver has enough information in the notification that they can make a decision without having to log in somewhere else to perform additional research.

Also some business don't like some of the standard features in the notification, things like request more information, forward, etc. Some of these data elements come from workflow notification templates that are used to provide high level functionality to a notification. I won't cover how to modify these templates but will provide the following reference on how to do it:

How To Change The Message Template, Remove the Approve & Reject Links, and Hide Request More Information Buttons from a Workflow E-mail Notification (Doc ID 302214.1).

Notifications are composed of Static Text, Workflow Attributes and optionally OA Framework Regions. They also can have attachments, which are links to EBS data elements and in future releases they will actually be an attachment object in the email. The following are the high level steps to modify a workflow notification.

- 1) Is the notification an OA Framework Region that can be personalized

The first thing to do prior to making a change is to not to code, but instead configure using personalizations. Make sure the notification mailer is rendering the page properly. Then see if you can personalize the regions to meet your requirement. The following are some references on how to do both of these tasks.

How to set the %AGENT% Profile Options correctly to use Workflow Notifications with Framework Content Regions when Advanced Configuration settings have been implemented in the Oracle Application environment? (Doc ID 1943176.1)

After Upgrade To R12.2.3 Requisition Approval Notification Does Not Show Requisition Lines (Doc ID 1614865.1)

2) Modify the Workflow Definition

If the first step did not work you will need to open the Workflow Builder and customize the Notification in the Workflow Process. This will require a developer resource and the desktop Workflow Builder tool which can be downloaded and installed following the steps in the reference:

How To Download and Install the Latest Oracle Workflow Builder (Client Tool) and XML Gateway Message Designer for E-Business Suite (Doc ID 261028.1)

You will need see if possibly an existing workflow attribute exists and all you would need to do is to add that to a workflow message. You can review the existing Workflow Attributes and verify they are set to values you are expecting. The best way is to get an approval process to the point where the approval email is sent and then log into EBS and use the Status Monitor to review the attributes. It is very important to notice that not all attributes are populated in a workflow. Also what you think an attribute means and holds may not be exactly what the developer thought. So review the attributes in an existing running workflow process to ensure it holds what you expect.

Responsibility: Workflow Administrator Web (New)
Navigation: Status Monitor

Query up the Workflow Item, using the Item Type and Item Key. Optionally you can work backwards from a Notification ID to determine an Item Type and Item Key. Scroll down to the Workflow Items. Workflow Attributes can hold Text/Numeric/Date data. There are also Document Type Attributes those hold a link to procedure that will generate the message content. Notice the examples in the picture below that begin with 'PLSQL'.

Document Type Attributes open up a whole world for custom Workflow Notification development. Anything you can create in PL/SQL can be called dynamically at run time to build the Workflow Notification content. You can build formatted HTML content that contains tables and formatting that is data dependent. This is a more advanced topic but take a look at the follow reference for more details: Oracle Workflow Notifications, http://jrpr.com/paper_archive/2_3_peters.ppt

The correct method to modify a Notification is to make a copy of the Workflow Message associated with it and edit the copy. The Workflow Message holds the Subject Line, Body, Attributes and Static Text, this is what you consider the actual message content. The Workflow Message is not versioned, that is why you must make a copy of the Message first. If you don't you will get errors in existing Workflow Processes that don't have the Attribute you reference defined in them. Remember that workflow makes versioned copy of the workflow definition to run a given process under. Therefore since Workflow Messages are not versioned they will try to reference data elements that don't exist. The Workflow Notification Activity references a Workflow Message and is versioned. You can change a Workflow Notification, but it is usually safer to copy an existing one and make changes in the copy.

You can add custom Workflow Attributes and reference them in your Workflow Message if you can't find an existing Attribute that holds the data you require. You will need to customize the Workflow Process to include a step to initialize or set the Workflow Attribute. You can reference the Workflow Attribute in a new/copied Workflow Message. You can reference the Workflow Message in a new/copied Workflow Notification activity.

Monitor Workflow Details: ASOAPPRV, 10252DET, 10252DET

View Process Hierarchy

 Expand All Collapse All								
								
Focus	Process Name	Status	Workflow Type	Item Key	User Key	Owned By	Started	Completed
	INDIVIDUAL_APPROVAL	✓ Complete	ASO Approval	10252DET	10252DET		29-Jun-2015 16:09:12	30-Jun-2015 09:56:16

Workflow Type ASO Approval Started 29-Jun-2015 16:09:12
 Status Complete Completed 30-Jun-2015 09:56:16

Workflow Definition

Internal Name ASOAPPRV
 Description
 Persistence Type Temporary
 Persistence Days 0
 Selector

Workflow Attributes

RECEIVER_DISPLAYNAME Riel, Kerry
 RECEIVER_USERNAME Riel, Kerry
 REQUESTOR_DISPLAYNAME Gilliland, Michelle
 REQUESTOR_USERNAME Gilliland, Michelle
 NOTE
 APPROVALID 10185
 APPROVAL_OBJECT 06468-Master Agreement-0-0-0
 APPROVAL_DET_ID 10252
 REQUEST_CANCELLOR_USERNAME
 REQUEST_CANCELLOR_DISPLAYNAME
 MESSAGE REQUEST_APPROVED_FYI
 NOTIFICATION_ID 10094617
 SEND TO
 RULE_DETAILS_DOC PLSQL:ASO_APR_WF_PVT.RULE_DETAILS_DOC/ASOAPPRV:&APPROVALID
 REQUESTER_COMMENTS_DOC PLSQL:ASO_APR_WF_PVT.REQUESTER_COMMENTS_DOC/ASOAPPRV:&APPROVALID
 APPROVER_DETAILS_DOC PLSQL:ASO_APR_WF_PVT.APPROVER_DETAILS_DOC/ASOAPPRV:&APPROVALID
 QUOTE_SUMMARY_DOC PLSQL:ASO_APR_WF_PVT.QUOTE_SUMMARY_DOC/ASOAPPRV:&APPROVALID

Mobile Approvals Application

Oracle has recently releases a series of Mobile Applications for the EBS. These are native iOS/Android application that communicates back to the EBS Applications Tier and seamlessly provides users with limited specific EBS functionality on their mobile device. These applications do not require additional licenses, if you are licensed for the base EBS module you can use the Mobile Application for free. See the following My Oracle Support note for the complete list of offerings.

Oracle E-Business Suite Mobile Apps, Release 12.1 and 12.2 Documentation Index (Doc ID 1641772.1)

The EBS Mobile Approvals Application is just one of these new mobile applications. Check the note below for supported applications modules and Approval Types. Not all Approval Types are supported see the following My Oracle Support note.

Oracle Mobile Approvals for Oracle E-Business Suite Release Notes (Doc ID 1642423.1)

In addition, custom Mobile Application development is made possible using the Mobile Applications Framework (MAF). See the following My Oracle Support note for additional details.

Oracle E-Business Suite Mobile Foundation Release Notes (Doc ID 1642431.1)

One of the big benefits to Mobile Applications is that they can access features on the mobile device. Things like cameras, speakers, microphones can be used by the application to improve the user experience. Also native UI components are available, so the Mobile Application acts just like any other application the user had downloaded to their smart phone or tablet.

The underlying technology being used by the Mobile Applications is the existing REST services in the Oracle EBS Applications Tier. (HTTPS/XML/JSON). Installation of a Mobile Application on the EBS side is just a patch to install the mobile application in the EBS. (12.1.3 and 12.2.3 on). On the mobile device users download mobile application from the Apple Apps Store or Google Play Store, search for 'Oracle EBS America'. You can also distribute Mobile Applications using Enterprise Distribution, handy for:

- Using Oracle Mobile Security Suite to manage devices
- Distributing branded the Mobile Application for your organization
- You want additional control over versions deployed
- You can distribute custom MAF applications

There are four technical architecture that can be used to deploy support for EBS Mobile Applications.

- 1) Use an existing EBS Applications Tier server
- 2) VPN on smartphone
- 3) Setup EBS DMZ Applications Tier server
- 4) Oracle Mobile Security Suite's (OMSS) Mobile Security Access Suite (MSAS) on the DMZ Applications Tier server and containerize EBS Smartphone Apps

Each of these has pros/cons. The table below summarizes at a high level some of the pros/cons of each architecture.

Option	Internal External	DMZ Tier	License Implication	Single pwd Multiple Apps	Remote Device Control
Existing EBS Apps Tier	Internal Only	No	No	No	No
VPN on smartphone	Both	No	No	No	No
EBS DMZ Apps Tier	Both	Yes	Possibly	No	No
Oracle Mobile Security Suite's	Both	Yes	Yes	Yes	Yes

Internal/External

This identifies if you can use the mobile application inside your network, or is it exposed to the internet and accessible anywhere. The first two options are the only ones that restricts you to internal usage

since we are using an existing EBS Applications Tier server. While the VPN solution is technically accessible anywhere with an internet connection, you are essentially putting your mobile device inside your corporate enetwork.

You don't want to expose a non-hardened EBS Applications Tier server to the internet since it has many access points which hackers can exploit to gain access to your systems. You should only deploy internet facing EBS Applications Tier servers in a DMZ following Oracle standards. Take a look at the following references for additional details:

Securing the Internet Facing E-Business Suite (ppt), Revision 1
http://jrjpr.com/paper_archive/john_peters_connection_point_2005.ppt

Oracle E-Business Suite R12 Configuration in a DMZ (Doc ID 380490.1)

DMZ Tier

Deploying using a DMZ Tier allows your mobile applications to access data from anywhere in the world with an internet connection. You should check with your Oracle Sales Rep to ensure you are licensed to deploy a DMZ Tier. This is an additional server and EBS Tier to maintain, so figure that into your decision to go this route.

License Implication

As mentioned above there is a potential license implication associated with an EBS DMZ Applications Tier. In the case of Oracle's Mobile Security Suite you will require an additional license since this is a standard product offering from Oracle.

Single PWD/Multiple Apps

With all of the solutions other than Oracle's Mobile Security Suite you will need to log into each Mobile Application independently. They are standalone applications on your mobile device and do not share anything between each other. When using Oracle's Mobile Security Suite they are containerized within that product. So you enter your password once and can access any of the Mobile Applications running under that container.

Remote Device Control

Only Oracle's Mobile Security Suite give the administrator the ability to force downloads of new mobile applications and versions. In addition, this product allows an administrator to remotely wipe the device removing any corporate information should the mobile device be lost or stolen.

Mobile Applications have many technical architecture decisions you must consider before deploying them. You can always start with the Internal Only or the VPN deployment and decide if the features of the more advanced solutions are worth the additional costs.

Archive of Approvals for Audit Purposes

Some EBS modules store the approval history in tables within that module:

- PO Approvals
- Requisition Approvals
- GL Approvals

Many EBS modules do not store the approval history outside of the Workflow module:

- ECO Approvals

When the Workflow Item is purged the approval history will be purged as well. We must run Workflow Purges in order to maintain Workflow performance. There is really no easy way to archive the Workflow Table Data prior or during purging. The Workflow data involves too many tables to store a good snapshot of the approval processing and foreign keys to the functional modules.

So it is important to test out Approvals functionality in a non-PROD environment along with the use of the Workflow Purge functionality. That is the only way to ensure that you can reliably run the Workflow Purge program and retain the Approval history for your particular EBS environment.

If you find that your Approval History is not stored in the functional module, you should log an enhancement request with the EBS functional development team, not the Workflow development team. Workflow is just a tool and the functional teams decide how the tool will be used, Approval History archiving is a functional gap.

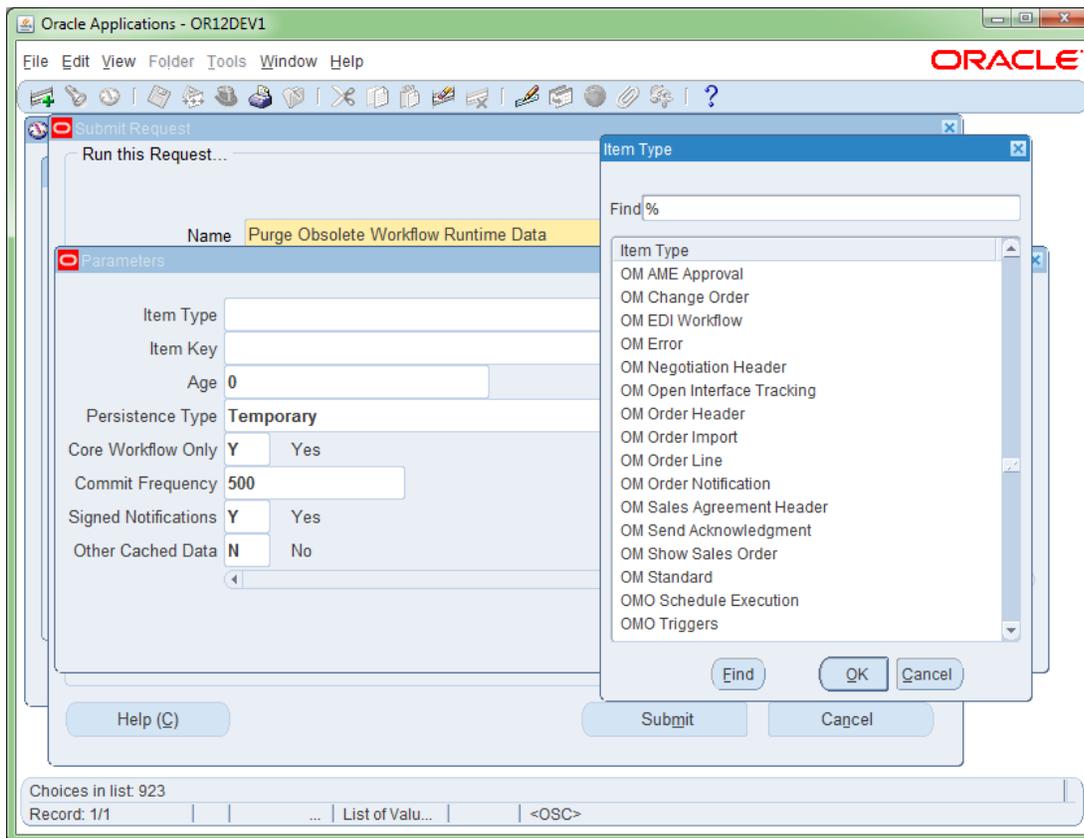
Once you have logged your Enhancement Request (which is essential to let the functional team know the importance of the data) you still need a solution to your immediate issue. There are three options:

1) Don't Implement the Approval Process

This is probably not an option but I will throw this out there for consideration.

2) Selectively Purge Workflows

While this is not ideal it is a short term solution. We must run the 'Purge Obsolete Workflow Runtime Data' program but we can specify the Item Type for the purge. As you can see if the LOV for the Item Type parameter on a 12.2.5 instance there are over 923 Item Types.



If you are a typical EBS customer you might have less than a couple dozen Item Types actively used. Run the query below to get your active Item Types:

```
select t1.DISPLAY_NAME,  
       t.NAME,  
       t.PERSISTENCE_TYPE,  
       count (*)
```

```

from WF_ITEM_TYPES_TL t1,
     WF_ITEM_TYPES t,
     WF_ITEMS i
where t.NAME = t1.NAME
     and i.ITEM_TYPE = t.NAME
group by t1.DISPLAY_NAME,
         t.NAME,
         t.PERSISTENCE_TYPE
order by 1;

```

Also look at the following My Oracle Support note on Workflow Purges:

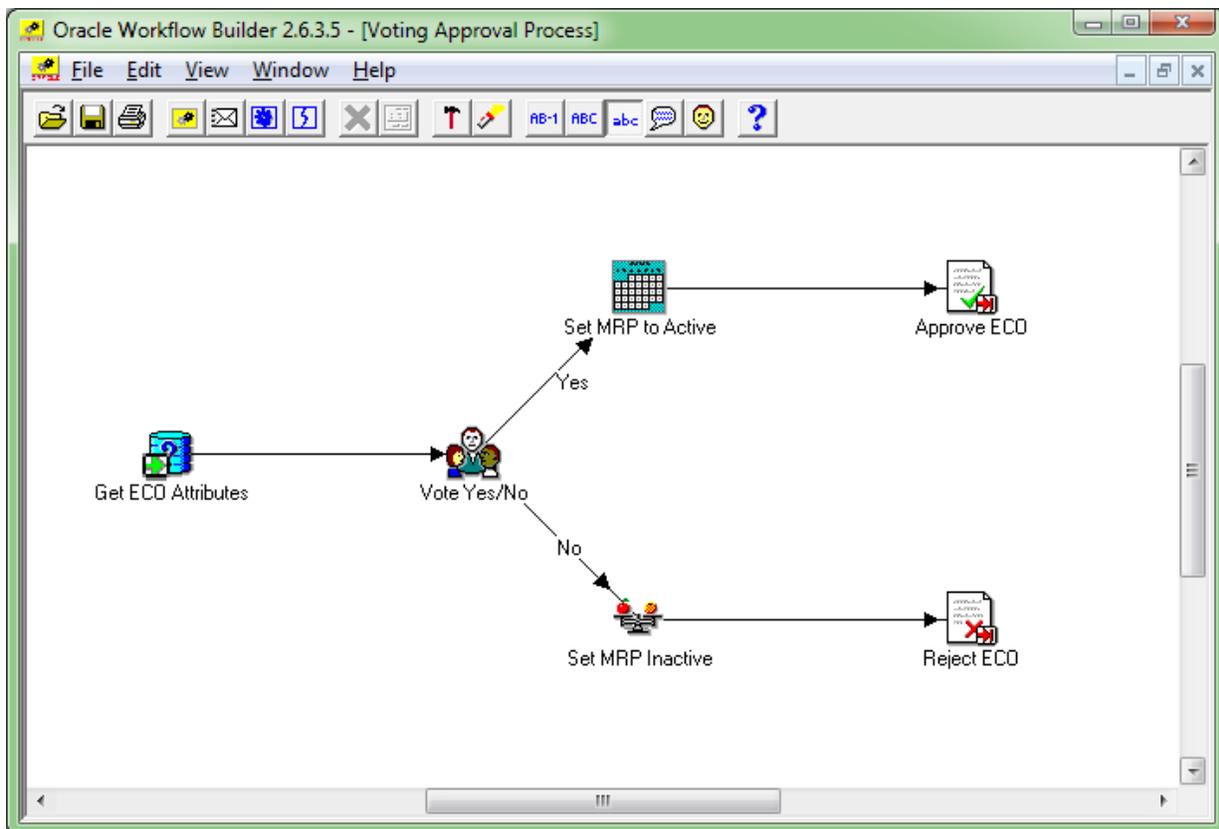
FAQ on Purging Oracle Workflow Data (Doc ID 277124.1)

3) Customize Workflow to Save Approvals

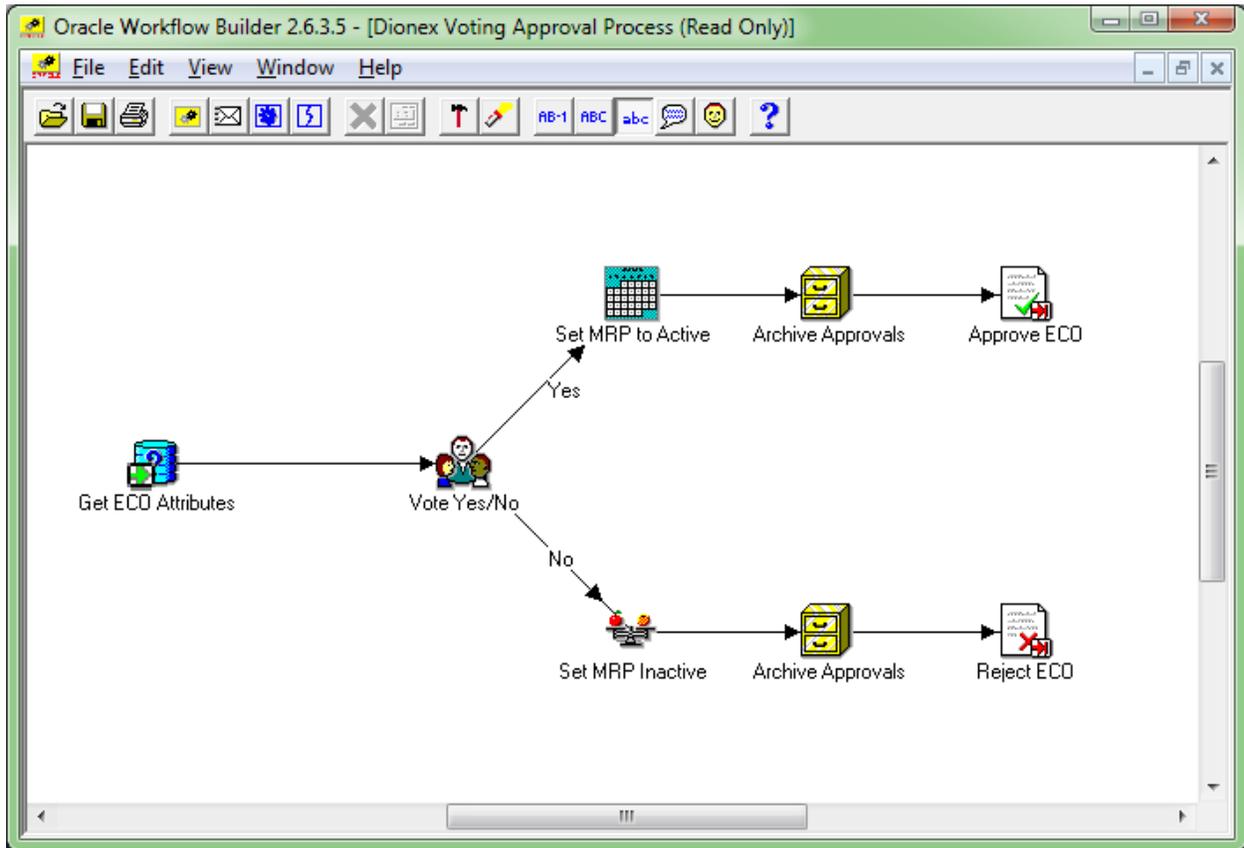
We need to save enough detail from the various workflow tables to provide:

- References to what the functional approval was for
- Who are all of the approvers
- What order did they respond to the notification, was the response from a transferred or delegated user
- What was the actual response

The example below is based on the ECO Approval Workflow. This is a nice simple approval process to show the concepts which can be applied to even the most complete seeded Workflow Approval Process. This is a voting based approval process, so many notifications are sent to multiple approvers simultaneously. The results are tallied and based on the final outcome a final response of Yes or No is set.



What we have done in this example is place a custom Archive Approvals Workflow Function at the very end of the approval process.



The Archive Approvals Workflow Function is Implemented as a PL/SQL Procedure. In summary this procedure does the following:

- 1) Queries WF_ITEM_ACTIVITY_STATUSES where the Activity is an Approval Activity
- 2) Query the Process Activity to get the Approver and Result
- 3) Store the Approver and Result into a custom table

This same generic set of steps can be used to also store many approvals in a non-voting serial approval process as well. One set of tables and PL/SQL procedures can possibly support many different approval types and item types. This can be architected to be fairly flexible. You will still need to add the Custom Workflow Function to each Item Type, and also add the Customer Workflow Function to the Workflow Process in the correct location to gather the approval results.

There are two custom tables required:

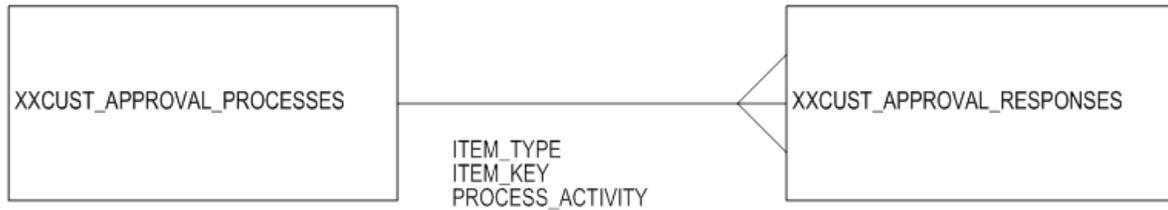
XXCUST_APPROVAL_PROCESSES

This table stores the high level workflow process information that is pulled from the tables WF_ITEMS and WF_ITEM_ACTIVITY_STATUSES

XXCUST_APPROVAL_RESPONSES

This stores the actual approval responses from the user community. This data is primarily pulled from the WF_NOTIFICATIONS table.

These tables are related as follows:



The actual table structures are shown in the tables below.

```

XXCUST_APPROVAL_PROCESSES
  ITEM_TYPE                VARCHAR2(8) not NULL,
  ITEM_KEY                 VARCHAR2(240) not NULL,
  USER_KEY                 VARCHAR2(240) not NULL,
  ROOT_ACTIVITY            VARCHAR2(30) not NULL,
  ROOT_ACTIVITY_VERSION    NUMBER not NULL,
  PROCESS_ACTIVITY         NUMBER not NULL,
  ACTIVITY_STATUS          VARCHAR2(30),
  ACTIVITY_RESULT_CODE     VARCHAR2(8),
  BEGIN_DATE               DATE,
  END_DATE                 DATE,
  PROCESS_NOTIFICATION_ID  NUMBER,
  ASSIGNED_USER_DISPLAY_NAME VARCHAR2(360),
  CREATION_DATE            DATE default SYSDATE,
  CREATED_BY               NUMBER,
  LAST_UPDATE_DATE         DATE default SYSDATE,
  LAST_UPDATED_BY          NUMBER,
  LAST_UPDATE_LOGIN        NUMBER,
  PROGRAM_APPLICATION_ID   NUMBER,
  PROGRAM_ID               NUMBER,
  PROGRAM_UPDATE_DATE      DATE,
  REQUEST_ID               NUMBER
    
```

```

XXCUST_APPROVAL_RESPONSES
  ITEM_TYPE                VARCHAR2(8) not NULL,
  ITEM_KEY                 VARCHAR2(240) not NULL,
  PROCESS_ACTIVITY         NUMBER not NULL,
  GROUP_ID                 NUMBER not NULL,
  NOTIFICATION_ID          NUMBER not NULL,
  RECIPIENT_ROLE           VARCHAR2(320) not NULL,
  MESSAGE_NAME             VARCHAR2(30) not NULL,
  STATUS                   VARCHAR2(8) not NULL,
  USER_COMMENT             VARCHAR2(4000),
  BEGIN_DATE               DATE,
  END_DATE                 DATE,
  RESULT                   VARCHAR2(4000)
    
```

This is not a huge customization effort, but you have to repeat for each Workflow Process you require Approvals History for if the base applications does not provide it. You can make this fairly generic to handle multiple Item Types. However, this still is a customization to the workflow processes. This will require maintenance as you patch and upgrade in the future. So consider this before you start down this path.

References

The following are references related to workflows and approvals that might be beneficial to you.

1) Karen Brownfields reference book on Workflow

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

You can purchase this from LuLu at <http://lulu.com> for \$69.99

Consider the electronic copy since you can search for things much faster than the paper copy.

2) My Web Site and Past Presentations

<http://jrpjr.com>

3) OAUG Workflow SIG

<http://workflowsig.communities.oaug.org/>

4) Infosemantics Presentations

<http://www.infosemantics.com/presentations/>

5) Workflow Blog

<http://blogs.oracle.com/oracleworkflow>

Great information on using GMAIL SMTP and IMAP servers

6) Information Center: E-Business Suite Oracle Workflow (WF) (Doc ID 1320509.2)

7) My Oracle Support Community

https://community.oracle.com/community/support/oracle_e-business_suite/core_workflow

8) Integration Blog

<http://blogs.oracle.com/ebusinesssuiteintegration>

9) EBS Workflow (WF) Analyzer (Doc ID 1369938.1)

Conclusion

This completes Part 3 of 4 of the Approvals Series. This paper tried to provide an introduction into EBS Approvals and some gaps and solutions. I hope you have found this helpful.