



COLLABORATE 12  
TECHNOLOGY AND APPLICATIONS FORUM  
FOR THE ORACLE COMMUNITY



# Workflow Performance Tuning in Release 12

Karen Brownfield

Rolta



Copyright © 2012 Karen Brownfield All Rights Reserved  
Any other commercial product names herein are trademark, registered  
trademarks or service marks of their respective owners.



# 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*

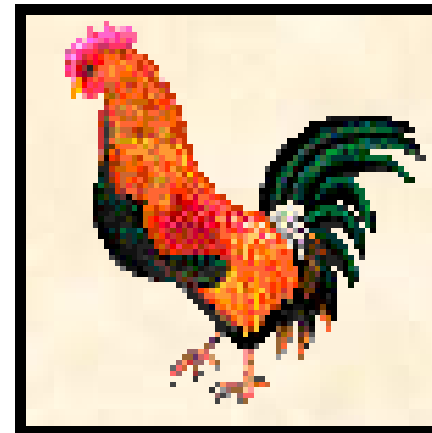


# Audience Profile

- Job Role
  - DBA
  - System or Workflow Administrator
  - Functional
- Database Level
  - 10gR2
  - 11gR1
  - 11gR2
- EBS Version
  - Release 11i.10
    - ATG\_PF.H RUP6
    - ATG\_PF.H RUP7
  - Release 12.0.6
  - Release 12.1.n
  - Not EBS



# Which Are You?



The opposite of the ostrich is the rooster who is alert and awake early to see what is on the horizon.

Rather than fear, he crows loudly a warning to be heeded by all.

Source: <http://users.cybertime.net/~ajgood/ostrich.html>



# Patch Current

- It's not just the RUPs, one-offs are important
- Workflow is dependant on HR, AME
  - Diagnostics are important also
- Product workflow fixes are provided by product team, not ATG patches
- See Workflow SIG site for list of one-off patches for 11i
  - All included in RUP7
  - [http://workflowsig.oaug.org/reference\\_info.html](http://workflowsig.oaug.org/reference_info.html)
- Only 1 known one-off for 12.1.3 – 9773716
  - Selector Function not re-executed for same type



# Clean up Errors

- Perform following query

```
SELECT    COUNT (*)
          ,item_type
          ,activity_name
          ,MIN (item_begin_date)
          ,MAX (item_begin_date)
FROM wf_item_activity_statuses_v
WHERE activity_status_code = 'ERROR'
      AND item_end_date IS NULL
GROUP BY item_type
          ,activity_name
ORDER BY 3 DESC, 1 DESC, 2;
```



# Clean up Errors

COUNT(*)	ITEM_TYPE	ACTIVITY_NAME	MIN(ITEM_BEGIN_DATE)	MAX(ITEM_BEGIN_DATE)
13	WFERROR	INITIALIZE_EVENT_ERROR	1/12/2009 5:08:04 PM	2/28/2009 9:49:52 AM
39	PAXWFHRU	NTF_ASSIGNMENT_UPD_FAIL	6/2/2006 7:22:21 PM	2/6/2009 6:28:35 PM
1	PONAUCT	AUCTION_START_EVENT	2/6/2009 3:13:04 PM	2/6/2009 3:13:04 PM
5	REQAPPRV	PO_REQ_APPROVED	7/5/2004 6:06:53 AM	10/1/2008 10:42:02 AM
1	XXHRVEMP	ESCALATE_TO_HR_MANAGER	3/29/2008 5:27:11 PM	3/29/2008 5:27:11 PM
9861	FTEPSUPD	INVOICE_STATUS_UPDATE	3/23/2005 12:46:18 AM	11/14/2007 1:51:54 PM
2	APINVAPR	ESCALATE_DOC_APPROVAL	10/31/2007 3:54:00 PM	11/1/2007 2:36:07 PM

- Triage – Most Recent, Highest Numbers
- It isn't enough to clean up the errored workflows



# Clean up Associated Error Item Types

- Perform following query

```
SELECT  item_type
        ,parent_item_type
        ,DECODE (end_date, NULL, 'OPEN', 'CLOSED')
          error_type_status
        ,COUNT (*)
FROM wf_items
WHERE parent_item_type is not null
      AND item_type in ('CUNNLWF', 'DOSFLOW', 'DOSFLOWE',
                        'ECXERROR', 'HRSSA', 'HRSTAND', 'HXCEMP', 'IBUHPSUB', 'OKLAMERR',
                        'OMERROR', 'PARMAAP', 'PARMATRX', 'POERROR', 'WFSTD', 'XDPWFSTD',
                        'ZPBWFERR', 'WFERROR')
GROUP BY item_type
        ,parent_item_type
        ,DECODE (end_date, NULL, 'OPEN', 'CLOSED')
ORDER BY item_type, parent_item_type;
```





# Clean up Associated Error Item Types

ITEM_TYPE	PARENT_ITEM_TYPE	ERROR_TYPE_STATUS	COUNT(*)
DOSFLOWE	DOSFLOWE	CLOSED	1
ECXERROR	OKLLPLBO	CLOSED	10
ECXERROR	OZFRESO	CLOSED	1
ECXERROR	SYNCITEM	CLOSED	13
HRSSA	HRSSA	CLOSED	12
OMERROR	OEOH	OPEN	36
OMERROR	OEOL	OPEN	1
PARMATRX	PARMATRX	OPEN	1
POERROR	REQAPPRV	CLOSED	19
POERROR	REQAPPRV	OPEN	3
WFERROR	ADSCUSTM	CLOSED	2
WFERROR	ADSSALES	CLOSED	749
WFERROR	AMSLISTG	CLOSED	10
WFERROR	APEMPVfy	CLOSED	2
WFERROR	APEXP	CLOSED	7
WFERROR	APEXP	OPEN	5

- Purge now closes WFERROR for closed workflows
  - WFERROR not the only Error Item Type
  - Can't purge if children open
- Notice chains OEOH→OMERROR→WFERROR  
OEOH→OEOL→WFERROR



# Clean up Event Errors

- Perform following query

```
SELECT  COUNT (*)
        ,v.text_value
        ,min(i.begin_date)
        ,max(i.begin_date)
FROM    wf_item_attribute_values v
        ,wf_items i
WHERE   v.item_key=i.item_key
        AND v.item_type = i.item_type
        AND v.item_type = 'WFERROR'
        AND v.NAME = 'EVENT_NAME'
        AND v.text_value IS NOT NULL
GROUP BY text_value
ORDER BY text_value;
```



# Clean up Event Errors

COUNT(*)	TEXT_VALUE	MIN(I.BEGIN_DATE)	MAX(I.BEGIN_DATE)
48	oracle.apps.ap.format.create	2/17/2006 4:41:25 AM	8/4/2006 2:08:25 AM
5	oracle.apps.ap.payment	7/30/2007 10:52:02 PM	11/14/2007 1:54:15 PM
22	oracle.apps.ar.hz.Location.create	4/12/2006 3:29:15 PM	7/25/2006 11:35:57 AM
12	oracle.apps.ar.hz.Location.update	2/7/2006 11:23:28 AM	6/26/2006 10:01:26 AM
6	oracle.apps.ar.hz.OrgContact.create	11/3/2008 1:48:14 PM	2/10/2009 5:17:39 PM
408	oracle.apps.fnd.system.exception	2/19/2007 3:42:42 AM	12/7/2008 9:27:43 PM
58	oracle.apps.fnd.wf.ds.user.updated	2/17/2008 6:07:14 PM	12/8/2008 3:49:08 PM
372	oracle.apps.ita.setup.record	2/20/2006 12:32:25 AM	2/28/2009 9:49:52 AM
1	oracle.apps.wf.notification.cancel	3/29/2008 10:29:42 PM	3/29/2008 10:29:42 PM
6	oracle.apps.wf.notification.send	4/12/2006 11:55:28 AM	3/29/2008 10:29:43 PM
5	sb.apps.xxhr.employee.create	9/4/2007 7:43:50 PM	9/4/2007 8:48:31 PM

- Find and fix what causes event to error
- Message to SYSADMIN can re-raise event if still needs processing, else abort WFERROR



# Purge!!!

11.5.10  
Purgeable  
for PERM  
always 0

Completed Work Items

Filter: Work Item Type Contains [ ] Go

Last Updated: 06-Feb-2008

Select a work item type and ... View Details

Select Work Item Type	Persistence Type	Retention Period	Count	Purgeable
<input checked="" type="radio"/> ADS HR Custom Workflows	PERM	0	2	2
<input type="radio"/> ADS Sales Notification	TEMP	0	1	1
<input type="radio"/> AME update FND user name	TEMP	0	1	1
<input type="radio"/> ASO Approval	TEMP	0	6	0
<input type="radio"/> Address Change	TEMP	0	5	5
<input type="radio"/> CLN Update Delivery Outbound	TEMP	0	1	1
<input type="radio"/> Change Action	PERM	0	9	9
<input type="radio"/> Change Workflow Routing Step	PERM	0	1	0
<input type="radio"/> Dossier Approval Flow Enhanced	TEMP	0	1	0
<input type="radio"/> EPB Business Process	TEMP	0	2	2
<input type="radio"/> Expenses	TEMP	0	7	7
<input type="radio"/> HR	TEMP	0	16	4
<input type="radio"/> IBC - Content Manager Workflow	TEMP	0	7	0
<input type="radio"/> Knowledge Management Workflow Process	SYNC	0	34	34
<input type="radio"/> Knowledge Management Workflow Process (New)	SYNC	0	165	165

Select a work item type and ... View Details

Purge View Purge Requests

- Need schedule for Temporary and for Permanent
- If Purgeable = 0, ensure child/parent workflows closed



# Purge Obsolete Workflow Runtime Data

- Schedule Nightly or at minimum Weekly
- Parameters
  - Leave Item Type/Item Key blank
  - Age – recommended at least 7, no more than 60
  - Persistence Type
    - One Schedule Temporary, one Permanent
  - Core Workflow Only – Set to Y
    - At least monthly, run schedule set to N
  - Commit Frequency – leave at default – 500 (that's 500 workflows, not 500 records)
  - Signed Notifications – Customer choice



# Purge My Oracle Support Notes

- 337923.1 "A closer examination of the Concurrent Program Purge Obsolete Workflow Runtime Data"
- 132254.1 "Speeding Up And Purging Workflows"
- 298550.1 "Troubleshooting Workflow Data Growth Issues"
- 780446.1 "Is It Possible To Run Multiple "Purge Obsolete Workflow Runtime Data" Programs Simultaneously With Different Item Type value.?"
- 144806.1 "A Detailed Approach to Purging Oracle Workflow Runtime Data"

Note: Referenced patches already included in 11i.10, R12



# Purge – What Happens

- Aborts WFERROR where PARENT\_ITEM\_TYPE matches Item Type parameter and where linked activity (PARENT\_CONTEXT) no longer in error status
  - But not POERROR, OMERROR or other error types
- Purges Item Types matching Item Type parameter if END\_DATE is not NULL and not linked to open parent or child workflow



# Purge – What Happens

- If "Core Workflow Only" = N
  - Purges WF\_ACTIVITIES table where END\_DATE is not NULL and ACTIVITY\_ID is not referenced in active workflows
  - End-dates, then deletes notifications not referenced in WF\_ITEM\_ACTIVITY\_STATUSES, \_H
    - Example: notifications from finished concurrent programs
  - Purges ad-hoc roles where ORIG\_SYSTEM = 'WF\_LOCAL\_ROLES' or 'WF\_LOCAL\_USERS' and not referenced in WF\_ROLE\_HIERARCHIES or WF\_NOTIFICATIONS or WF\_ITEMS.OWNER\_ROLE





# If Catching up on Purging

- Purge by Item Type to avoid exceeding Rollback size
  - Alternative, purge by age with increasingly smaller values (diagnostic will give year started)
- Each run may take hours
- Run with "Core Workflow Only" = Y
- Note: 10g, 11g automatically reset high water marks, so export/import no longer required
- After catching up on purging, run one more time with "Core Workflow Only" = N
  - Running with this value should only be necessary once/month



# If Catching up on Purging

- Unreferenced Notifications
  - 266614.1 "Troubleshooting Workflow Issues in Applications 11i", section "Purging Unreferenced Notifications"
  - Referenced patch included in 11i.10
  - Wfntfprg.sql
    - Note instructions to purge messages from FNDCMMMSG (notifications of finished concurrent requests)



# Configure (Setup) Seeded Workflows

- Read the documentation
  - Setup
  - How the workflow behaves
  - My Oracle Support white papers, notes
- Setup not just Builder
  - Profile Options
  - Approvals Management Engine (AME)
  - Hierarchies
  - Other Screens



# Background Engines

- Run Engine for Stuck separately
  - Parameters NULL,NULL,NULL,No,No,Yes
  - Run once/week or once/month
- Run Engine for Timed Out activities separately based on criticality of timeout
  - If average timeout = 1 day, run once/day
  - Parameters NULL,NULL,NULL,No,Yes,No



# Background Engines

- Run Engine for Deferred activities separately based on criticality of activity
  - Except for OEOL, very few workflows need moving more than every 15 minutes
  - If Order volume high, run "targeted" engine for OEOL every 5 minutes
    - Parameters: Order Line, NULL, NULL, Yes, No, No
  - Run generic every 15–60 minutes
    - Parameters: NULL, NULL, NULL, Yes, No, No



# Background Engines

- Activities in queue table WF\_DEFERRED\_TABLE\_M
  - Time to process = DEQ\_TIME – ENQ\_TIME where STATE=2
- 369537.1 "How to Monitor the FNDWFBG – Workflow Background Program"
  - Scripts: what's in queue, what will be dequeued next
- 466535.1 "How to Resolve the Most Common Workflow Background Engine Problems"
  - If using 10.2.0.4 and RAC, apply patch 6600051



# Background Engine Runs a Long Time

- 186361.1 "WF 2.x: Workflow Background Process Performance Troubleshooting Guide"
  - Determine the Item Type Causing the Issue
    - SQL Trace
    - Monitor WF\_DEFERRED\_TABLE\_M before running (order by PRIORITY, ENQ\_TIME, STATE=0) then after running (STATE=2)
      - Review Status Monitor for Item Types processed, usually activity in workflow is the culprit, not Background Engine
    - Loop in Workflow – see Large Activity History from 'Workflow Status and Purgeable Items' Diagnostic (R11i) or Health Check Diagnostic (R12) or WF Analyzer script (MOS note 1369938.1)



# Background Engine Runs a Long Time

- 560144.1 "11.5.10.4: Workflow Background Process Seems To Take Longer After Rup4"
  - Don't use re-submit time < 5 minutes
  - AQ\_TM\_PROCESSES must be at least 1
    - Notes – see next page for advice
      - 746313.1 "What should be the Correct Setting for Parameter AQ\_TM\_PROCESSES in E-Business Suite Instances"
      - 428441.1 ""Warning: Aq\_tm\_processes Is Set To 0" Message in Alert Log After Upgrade to 10.2.0.3 or Higher"
      - 396009.1 "Database Initialization Parameters for Oracle E-Business Suite Release 12"





# Background Engine Runs a Long Time

- AQ\_TM\_PROCESSES
  - 746313.1 – dated September 2010
    - As of 10g, database can “autotune”
    - Never set > 9
    - If not set, common workflow diagnostics will return 0 value
    - Recommends still setting the value
  - 428441.1 – dated December 2011
    - Details how to check whether parameter = 0 or is set to autotune
  - 396009.1 – dated February 2012
    - Autotuning not tested with EBS, don’t use – bad info, ignore



# Background Engine Runs a Long Time

- 560144.1 "11.5.10.4: Workflow Background Process Seems To Take Longer After Rup4" (cont)
  - Perform regular rebuilds/coalesces on all the indexes/IOTS
    - Follow steps in MOS note 271855.1 "Procedure to manually Coalesce all the IOTs/indexes Associated with Advanced Queuing tables to maintain Enqueue/Dequeue performance, reduce QMON CPU usage and Redo generation"
  - JOB\_QUEUE\_PROCESSES at least 5
    - OAM recommends value of 10
    - Oracle seeds this to 2, it should be changed ASAP
    - 396009.1 – dated February 2012
      - Recommends value of 2 – this is wrong, ignore



# Background Engine Runs a Long Time

- 578831.1 “How to determine the correct setting for JOB\_QUEUE\_PROCESSES”
  - Ideal setting – number of jobs that would run concurrently plus a few more
  - Explains how to monitor and set this
  - Recommends periodic review of monitoring
    - Check during heavy periods of use: last day of month, month end



# Advanced Queuing Performance

- 469009.1 "Troubleshooting Workflow Agent Listener's failure to start"
- 741087.1 "High Logging Messages on WF\_EVENT\_OJMSTEXT\_QH procedure"
  - Verify Profile options (issue is level 2, 3 messages)
    - FND: Debug Log Level – Unexpected (level 6)
      - Note: 1107970.1 recommends setting
        - FND: Debug Log Enabled – Yes
        - FND: Debug Module = %
  - Set Log Level for each Listener to Error, then stop and restart Workflow Agent Listener Container



# Advanced Queuing Performance

- Memory insufficient or Containers consuming all available memory
  - 444939.1 "How do you Change the Maximum Memory Size taken by Workflow Service Container"
- Retention
  - Increases performance if = 0, but destroys ability to tune, troubleshoot
  - Recommend 1 day – 86400 seconds
    - Decrease WF\_IN/OUT WF\_REPLAY\_IN/OUT
    - Increase WF\_ERROR, WF\_JAVA\_ERROR
    - `Dbms_aqadm.alter_queue(queue_name=>'<queue >', retention_time=>86400);`



# WF\_CONTROL

- Controls all other queues
- Run 'Control Queue Cleanup' every 12 hours
- Note 469045.1 "Troubleshooting WF\_CONTROL Agent Issues"
  - Discussion of this queue
  - Scripts to run to ensure subscribers are valid and dead subscribers are removed properly



# WF\_DEFERRED Performance

- Subscriptions to Events Phase > 100
- Workflows started by events
- 334348.1 "Low Performance Processing Messages in WF\_DEFERRED Queue"; 468650.1 "Troubleshooting WF\_DEFERRED Agent Listeners Performance"
  - Use SQL to determine Events in queue
  - Identify if events not being dequeued in timely fashion
    - time in queue > 2X sleep time for queue
  - Identify Events with long processing time
    - Trace code and identify issues (bugs, tuning, etc)



# WF\_DEFERRED Performance

- 334348.1 "Low Performance Processing Messages in WF\_DEFERRED Queue"; 468650.1 "Troubleshooting WF\_DEFERRED Agent Listeners Performance" (cont)
  - Identify Events with high volume
    - Create additional generic agent listeners
    - Create specific agent listeners
    - Increase 'Inbound Thread Count' (PROCESSOR\_IN\_THREAD\_COUNT) by 1 until performance acceptable
  - Temporarily set retention time to 0





# WF\_DEFERRED Performance

- Queue may be corrupt
  - Receiving Errors "ORA-24033: No Recipients for Message"
  - Rebuild using instructions in MOS note 286394.1 "How to rebuild the WF\_DEFERRED queue"



# Workflow Analyzer

- MOS note 1369938.1 “Workflow Analyzer script for E-Business Suite Workflow Monitoring and Maintenance”
  - Better than R12 Workflow Health Check Diagnostic or 11i Workflow Status and Purgeable Items or Workflow Performance
  - SQL script introduced Dec 6, 2011
    - Author, Bill Burbage, working on instructions to register as concurrent program
  - Updated frequently
  - Use it, follow it, rerun it until your dashboard is green, then at least once a quarter



# Workflow Analyzer

## Table of Contents

### [Workflow Analyzer Overview](#)

- [E-Business Suite Version](#)
- [Workflow Database Parameter Settings](#)

### [Workflow Administration](#)

- [Verify the Workflow Administrator Role](#)
- [SYSADMIN WorkList Access](#)
- [Verify AutoClose FYI Setting](#)
- [E-Business Suite Profile Settings](#)
- [Workflow Profile Settings](#)
- [Verify Error Messages](#)
- [Verify #STUCK Activities](#)
- [Totals for Notification Preferences](#)
- [Check the Status of Workflow Services](#)

### [Workflow Footprint](#)

- [Volume of Workflow Runtime Data Tables](#)
- [Verify Closed and Purgeable TEMP Items](#)
- [SUMMARY Of Workflow Processes By Item Type](#)
- [Check the Volume of Open and Closed Items Annually](#)
- [Average Volume of Opened Items in the past 6 Months, Monthly, and Daily](#)
- [Total Items Opened Over 90 Days Ago](#)
- [Check Top 30 Large Item Activity Status History Items](#)

### [Workflow Concurrent Programs](#)

- [Verify Concurrent Programs Scheduled to Run](#)
- [Verify Workflow Background Processes that ran](#)
- [Verify Status of the Workflow Background Engine Deferred Queue Table](#)
- [Verify Workflow Purge Concurrent Programs](#)
- [Verify Workflow Control Queue Cleanup Programs](#)

### [Workflow Notification Mailer](#)

- [Check the status of the Workflow Services](#)
- [Check the status of the Workflow Notification Mailer\(s\)](#)
- [Check Status of WF\\_NOTIFICATIONS Table](#)
- [Check Status of WF\\_NOTIFICATION\\_OUT Table](#)
- [Check for Orphaned Notifications](#)

### [Workflow Patch Levels](#)

- [Applied ATG Patches](#)
- [Known 1-Off Patches on top of ATG Rollups](#)
- [Verify Status of Workflow Log Levels](#)
- [Verify Workflow Services Log Locations](#)

### [References](#)



# WF Analyzer Dashboard

## Workflow Analyzer Overview

### Workflow Runtime Data Table Gauge



**Your overall Workflow HealthCheck Status is in need of Immediate Review!**

The WF\_ITEMS Table has obsolete workflow runtime data that is older than 3 years.



# WF Analyzer – Profile Options

E-Business Suite Profile Settings				SQL Script
ID	PROFILE_OPTION_NAME	PROFILE	VALUE	DESCRIPTION
1002248	CONC_GSM_ENABLED	Concurrent:GSM Enabled	Y	Enable Generic Service Management
1005298	FND_VALIDATION_LEVEL	FND Validation Level	ERROR	
1002286	AMPOOL_ENABLED	FND: Application Module Pool Enabled	Y	Application Module Pool Enabled. If this is No ('N') then application module pooling will be disabled.
1002247	AFLOG_ENABLED	FND: Debug Log Enabled	Y	Log Enabled. If this is No ('N') then logging & alerting will not occur at runtime.
3099	AFLOG_LEVEL	FND: Debug Log Level	6	Minimum level for Logging. If this profile isn't set, the default level is 6 (UNEXPECTED).
1005247	AFLOG_BUFFER_MODE	FND: Debug Log Mode	2	Asynchronous Logging Mode
3100	AFLOG_MODULE	FND: Debug Log Module	%	Module filter(s) for Logging. This is a space separated list of modules. If there is no value for this profile, all modules will be logged.
1004600	FND_FWK_COMPATIBILITY_MODE	FND: Framework Compatibility Mode	11.5.10	Used to ensure backward compatibility. Specifies which framework version behavior should be retained.
1000993	FND_MIGRATED_TO_JRAD	FND: Migrated To JRAD	N	Profile option to indicate whether the application has been migrated to JRAD
1005308	WF_VALIDATE_NTF_ACCESS	WF: GUEST Access to Notification	N	Users can access the notification detail page without logging on to the Oracle E-Business Suite
1002379	FND_NTF_REASSIGN_MODE	WF: Notification Reassign Mode	REASSIGN	Specify whether Notification User Interface(s) provides access to full Reassign capability, including Delegate and T transfer, or merely Delegate
1005302	WF_ROUTE_RULE_ALLOW_ALL	WF: Vacation Rules - Allow All	Y	Profile option to enable/disable display of 'All' option in Routing Rules Item Types dropdown.

[Back to Top](#)

**Note: Profile "Concurrent:GSM Enabled" is enabled as expected.**  
The profile "Concurrent:GSM Enabled" is currently set to Y to allow GSM to enable running workflows. This is expected as GSM must be enabled in order to process workflow. Please review [Note 1191400.1](#) - Troubleshooting Oracle Workflow Java Notification Mailer, for more information.

Workflow Profile Settings				SQL Script
ID	PROFILE_OPTION_NAME	PROFILE	VALUE	
1002652	APPS_FRAMEWORK_AGENT	Application Framework Agent	http://ora12migapp2.pgworks.com:8080	
1005307	WF_MAIL_WEB_AGENT	WF: Workflow Mailer Framework Web Agent	NOT SET - Replace with specific Web Server URL (non-virtual) if using load balancers	



# Profile Options - Others

- Account Generator:Run in Debug Mode
  - Except when experiencing an issue with Account Generator, set it to 'No'
  - Make sure when problem fixed to purge workflows and reset
- PO:Workflow Processing Mode
  - If set to 'Online', screen does not return control to Buyer until workflow ends or notification requiring response is encountered
  - If Buyers cannot self–approve POs, set to 'Background'

**WARNING** - Enable profile option WF: Enable Bulk Notification Response by setting to Yes at Site level, and bounce the middle tier to accept the new System Profile setting  
**ACTION** - If this profile option is not set, Apply Patch 6722406 ontop of 11i.ATG\_PF.H.RUP6 environment or apply Patch 6241631 11i.ATG\_PF.H.RUP7. Please see note [9760386.1](#)



# Profile Options - Others

- HR:Defer Update After Approval
  - If set to 'Yes', all database commits are held until next Background Engine
    - 317002.1 "Approval Is Delayed In Defer Thread Activity" , 469617.1 "Appraisals Remain In Pending Approval Status", and 466339.1 "Approved Enrollment Still In Requested Status When Class Status Is Normal"
    - Adjust AME FYI rules according to MOS note 472387.1 "FYI Notifications Closed Automatically and Not Showing Up on Worklist"





# WF Analyzer – Background Queue

Verify Status of the Workflow Background Engine Deferred Queue Table [\[Top\]](#)

CORR_ID	STATE	COUNT
APPSOEOH	READY	229
APPSCNCOMPPR	READY	1
APPSPACRMUPD	READY	5
APPSPAXWFHRU	READY	2
APPSSERVEREQ	READY	1

5 rows retrieved

• [See SQL](#)

Verify Status of the Workflow Background Engine Deferred Queue Table

[SQL Script](#)

CORR_ID	STATE	COUNT
---------	-------	-------

- Workflow Background Engine Status
  - Lists Activities waiting for Deferred Background Engine
  - Note counts of Ready, run SQL and see if queue is steady or growing
    - If always empty, increase wait time (sleep time) for next execution of Background Engine





# WF Analyzer – Large Activity History

Check Top 30 Large Item Activity Status History Items [\[Top\]](#)

ITEM_TYPE	ITEM_KEY	COUNT	BEGIN_DATE	END_DATE	DESCRIPTION
SERVEREQ	18860-1371	702	2003-08-22		

1 row retrieved

- [See SQL](#)
- Workflow may use WAITS and other looping activities to process delayed responses and other criteria. Each revisit of a node replaces the previous data with the current activities status and stores the old activity information into a activities history table. Looking at this history table can help to identify possible long running workflows that appear to be stuck in a loop over a long time, or a poorly designed workflow that is looping excessively and can cause performance issues. Currently, the largest single activity found in the history table is for Item\_Type : SERVEREQ and item\_key : 18860-1371

**ATTENTION** - This workflow process is still open, and was started back on 2003-08-22. Please review on how to drill down and discover how to close and purge this workflow data

- So far this single activity for this single item\_key has looped 702 times since it started in 2003-08-22
- This activity SERVEREQ : 18860-1371 has been looping for 2629 days, which is a

Check Top 30 Large Item Activity Status History Items [SQL Script](#)

ITEM_TYPE	ITEM_KEY	COUNT	BEGIN_DATE	END_DATE	DESCRIPTION
-----------	----------	-------	------------	----------	-------------

There are NO ROWS found in the HISTORY table that have 500+ rows associated to the same item\_key. This is a good result, which means there is no major looping issues at this time.

- Large Activity History
  - Lists individual workflows where single activity executes > 500 times
  - Can click [See SQL](#) for code used



# WF Analyzer – Annual Counts

**SUMMARY Of Workflow Processes By Item Type** SQL Script

ACTIVE	COMPLETED	PURGEABLE	ITEM_NAME	DISPLAY_NAME	PERSISTENCE_TYPE	PERSISTENCE_DAYS	ERRORED	DEFERRED	SUSPENDED
377	133,193	133,082	POAPPRV	PO Approval	TEMP	0	15	0	0
56	31,973	31,949	REQAPPRV	Requisition	TEMP	0	12	0	0
148	157	152	POERROR	PO Approval Error	TEMP	0	88	0	0
225	3	3	WFERROR	System: Error	TEMP	0	79	0	0
1	0	0	UMXRGVC	UMX Registration Service Page Flow	TEMP	0	0	0	0
1	0	0	AZNM000	Procurement Processes	TEMP	0	0	0	0

[Back to Top](#)

**Check the Volume of Open and Closed Items Annually** SQL Script

ITEM_TYPE	DISPLAY_NAME	PERSISTENCE	P_DAYS	CLOSED	COUNT
POAPPRV	PO Approval	TEMP	0	2004	8,225
POXML	PO Xml Delivery	TEMP	0	2004	7,617
CREATEPO	PO Create Documents	TEMP	0	2004	5,183
REQAPPRV	Requisition	TEMP	0	2004	2,057

- Open and Closed Items Annually
  - Verify Persistence
  - Stats to help with Background Engine balancing

**Average Volume of Opened Items in the past 6 Months, Monthly, and Daily** SQL Script

ITEM_TYPE	6_MONTHS	MONTHLY	DAILY
POAPPRV	7,285	1,214	40
POXML	6,914	1,152	38
CREATEPO	3,910	652	22



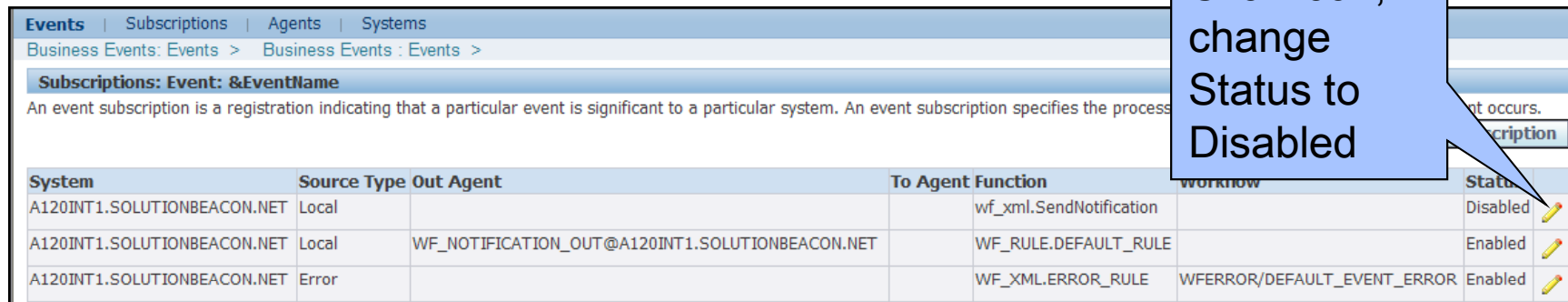
# WF Analyzer – Closed, Can't Purge




Verify Closed and Purgeable TEMP Items				SQL Script
CLOSED ITEMS	PURGEABLE	ITEM TYPE	DISPLAY NAME	PERSISTENCE DAYS
133,193	133,082	POAPPRV	PO Approval	0
125,520	125,515	POXML	PO Xml Delivery	0
83,690	83,690	CREATEPO	PO Create Documents	0
31,973	31,949	REQAPPRV	Requisition	0
173	173	OAM_BE	OAM Business Exception	0
157	152	POERROR	PO Approval Error	0
10	10	AMEUPDUN	AME update FND user name	0
3	3	WFERROR	System: Error	0

- Closed Items not eligible for purging – MOS note 186361.1 “WF 2.x: Background Process Performance Troubleshooting Guide”



# Notification Mailer



System	Source Type	Out Agent	To Agent Function	Workflow	Status
A120INT1.SOLUTIONBEACON.NET	Local		wf_xml.SendNotification		Disabled 
A120INT1.SOLUTIONBEACON.NET	Local	WF_NOTIFICATION_OUT@A120INT1.SOLUTIONBEACON.NET	WF_RULE.DEFAULT_RULE		Enabled 
A120INT1.SOLUTIONBEACON.NET	Error		WF_XML.ERROR_RULE	WFERROR/DEFAULT_EVENT_ERROR	Enabled 

- If global preference is 'Do not send me mail' (QUERY)
  - Use Framework Personalization – prohibit override from Preferences link
    - Ensure records in FND\_USER\_PREFERENCES updated to QUERY
  - Disable Local subscription event  
oracle.apps.wf.notification.send.group
  - 453137.1 "Oracle Workflow Best Practices Release 12 and Release 11i"
- Remember Alert now uses the workflow Mailer



# Notification Mailer

- If global preference is 'Do Not Send Me Mail' and not running Alert
  - Don't Start Mailer
  - Set Startup mode for following listeners to Manual or On Demand
    - Workflow Deferred Notification Agent Listener
    - Workflow Inbound Notifications Agent Listener
- Monitor WF\_NOTIFICATION\_IN, \_OUT
- Monitor WF\_DEFERRED for oracle.apps.wf.notification.% events



# Notification Mailer

- If Inbound Processing is not checked and not running Alert inbound processing
  - Set Startup mode for following listeners to Manual or On Demand
    - Workflow Inbound Notifications Agent Listener
- Monitor WF\_NOTIFICATION\_IN



# Notification Mailer

- Mailer only for Alert
  - 463777.1 "How to Disable all Workflow related Email Notifications Except for the Ones Sent from Oracle Alerts?"
  - Create new Mailer
    - ATG\_PF.H.delta.5+ – set Correlation id = ALR:%



# Notification Mailer

**Edit Workflow Mailer: Details: a120int1**

Cancel Back Step 2 of 8 Next

ID **10006**  
Status **Running**  
Name **Workflow Notification Mailer**  
\* Container Workflow Mailer Service

\* Max Error Count 10  
\* Inbound Thread Count 0  
\* Outbound Thread Count 1  
\* Log Level Error  
\* Processor Read Wait Timeout 10  
\* Processor Min Loop Sleep 5  
\* Processor Max Loop Sleep 60  
\* Processor Error Loop Sleep 60

Processor Close on Read Timeout

- Increase Inbound Polling Interval – Processor Min Loop Sleep (seconds) – ensure Processor Max Loop Sleep at least 5\*Processor Min Loop Sleep
  - Note 315748.1 "How To Change The Java Workflow Mailer Inbound Polling Interval"





# Notification Mailer

Edit Workflow Mailer: Details: a120int1

Cancel Back Step 2 of 8 Next

ID 10006  
Status **Running**  
Name **Workflow Notification Mailer**  
\* Container Workflow Mailer Service  
\* Max Error Count 10  
\* Inbound Thread Count 0  
\* Outbound Thread Count 1  
\* Log Level Error  
\* Processor Read Wait Timeout 10  
\* Processor Min Loop Sleep 5  
\* Processor Max Loop Sleep 60  
\* Processor Error Loop Sleep 60  
 Processor Close on Read Timeout

Click it, issues outweigh benefits

- Processor Close on Read Timeout
  - 315748.1 – unclick for performance
  - 422870.1 – unless clicks, not removed from Process folder
  - 332152.1 – must be clicked if running multiple mailers using same SMTP Server (Outbound Name) or will get contention and locking
  - 437986.1 – must be clicked or messages get stuck in Inbox



# Notification Mailer

- Mailer Log shows java.lang.OutOfMemoryError
  - 467516.1 "Users suddenly (sic) Stop Receiving Email Notifications"
    - Insufficient Heap Size (Xmx and Xms)
    - Edit \$APPL\_TOP/admin/adovars.env
      - Add/change following
        - APPSJROPT="-Xms128m -Xmx3072m"
        - export APPSJROPT
    - Bounce Concurrent Managers



# Notification Mailer

- "You Have Insufficient Privileges"
  - 414376.1 ""You Have Insufficient Privileges For The Current Operation" On Reqapprv Notif"
  - Create dedicated user for the mailer
  - Framework URL timeout = 120

Send

\* From: Workflow Mailer  
The value that appears in the From field in the header of outbound e-mails.

\* Reply-to Address: vis1200int1@solutionbeacon.net  
The address of the e-mail account that receives incoming messages, to which notification responses should be sent (for example: fred.smith@company.com).

\* HTML Agent: http://vis1200int1.solutionbeacon.net:80/pls/a120int1  
The base URL that identifies the HTML web agent that handles HTML notification responses, in the following format: http://<server.com:portID>/pls/<DAD\_name>

\* Message Formatter: oracle.apps.fnd.wf.mailer.NotificationFormatter

\* Framework User: 0

\* Framework Responsibility: 20420

\* Framework Application ID: 1

\* Framework URL timeout: 120

Attach images to outbound emails

Attach stylesheet to outbound email

Autoclose FYI  
Select this option to automatically closes notifications that do not require a response after the notifications are successfully sent.

Direct response  
Check this to specify that direct response is required (only available for notifications to 'MAILTEXT' and 'MAILATTH' roles)

Reset NLS  
Select this option to set the character set for e-mail notifications according to the notification recipient's preference.

Inline Attachments  
Select this option to have the mail client display attachments inline.

Send warning for unsolicited e-mail

Send e-mails for canceled notifications

**0 is SYSADMIN**



# Notification Mailer

- Setup separate user to run the Mailer
  - 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 WFERRO emails
  - Manageability: Enabling log for SYSADMIN includes many other functions than mailer thus hampering troubleshooting



# Notification Mailer

- Tag Files
  - Out of Office, Undeliverable – set to Ignore
    - 388709.1 "Email Notification Failures Are Causing The Email Servers To Crash"
- Uncheck Mailer parameter "Send warning for unsolicited e-mail"
  - 431359.1 "Setting up a Tag in the Mailer configuration files to handle unsolicited mail"
- Uncheck Mailer parameter 'Send e-mails for canceled notifications'



# Workflow Statistics Programs

- The programs
  - Workflow Mailer Statistics Concurrent Program
  - Workflow Work Items Statistics Concurrent Program
  - Workflow Agent Activity Statistics Concurrent Program
- Run Once/Day
  - Admin must remember to refresh queries
- 787228.1 "Cannot Abort Old Open Items in Workflow Manager Because Errored Items are not Returned"
  - 12.0.4 – wf\_item\_types.num\_error =0, won't show
  - 12.0.6 – click refresh button and is re-calculated

<b>Agent Activity: a120int1</b>
Review the numbers of event mes
Last Updated: 05-Mar-2009



# Workflow Concurrent Managers

- WFMGSMS (Workflow Summary Mailer) and Workflow Mailer (WFMGSMD) concurrent managers are for old mailer and must be disabled
  - If enabled, follow instructions MOS note 434161.1 "When Attempting To Stop the Concurrent Managers – All Services are Terminated Except FNDSM and WFMLRGSM"
- Workflow Agent Listener Service (WFALSNRSVC) must be enabled and active – always
- Workflow Mailer Service (WFMLRSVC) must be enabled if emailing notifications or running Alert
- Workflow Document Web Services Service (WFWSSVC) must be enabled to use Web Services



# Pinning

- Objects "pinned" into memory so they do not need to be constantly reloaded from disk, flushed out of memory and reloaded
  - PIND
  - 301171.1 "Toolkit for dynamic marking of Library Cache objects as Kept (PIND)"
  - Requires large SGA and memory





# Run 64-bit Database

- Memory is critical, 32-bit can't address enough
- Intelligent pinning – WF\_ packages
- 11g database is recommended
  - 10.2.0.5 in Extended Support
- If running lower version of database, upgrade



# Partition Tables

- Perform after Purge cleanup
  - Doing this replaces need to export/import
- Backup following tables
  - WF\_ITEM\_ACTIVITY\_STATUSES
  - WF\_ITEM\_ACTIVITY\_STATUSES\_H
  - WF\_ITEM\_ATTRIBUTE\_VALUES
  - WF\_ITEMS
- Ensure have free space in same tablespace slightly more than currently used (incl. indices)
- Move to OATM first – MOS note 402720.1 “OATM Migration fails with ORA-14257 when moving list partitioned tables”



# Partition Tables – 11i

- 260884.1 "How to Partition tables in OWF.G", no longer wfupartb.sql
- Script \$FND\_TOP/patch/115/sql/WFPART.sql  
Sqlplus: <apps\_user>/<passwd> @wfpart <fnd\_user>  
    <fnd\_passwd> <apps\_user> <apps\_passwd>  
    <utl\_dir\_location>
- Script only has to be performed once
- Uses DDL operations running in nologging mode – rollback not possible
  - Failure requires restore of tables



# Partition Tables Issues

- WFPART.sql does not create required index WF\_ITEM\_ACTIVITY\_STATUSES\_N4 and WF\_ITEM\_ACTIVITY\_STATUSES\_H\_N3
  - 11i.10 - Patch 7252442
    - 749105.1 "Index WF\_ITEM\_ACTIVITY\_STATUSES\_N4 Is Not Created When Using wfpart.sql"
    - Requires FND.H, not in RUP6
  - R12 – Patch 8241676
    - 789528.1 "Missing Index WF\_ITEM\_ACTIVITY\_STATUSES\_H\_N3 and WF\_ITEM\_ACTIVITY\_STATUSES\_N4 Using wfpart.sql"
    - Requires 12.0.6



# Wffngen.sql

- Translates activity function calls into static calls
  - According to Oracle, 25% increase in performance
- Look for variable itemTypeList\_t
  - Seeded := itemTypeList\_t ('WFSTD','FNDFFWF')
  - Add following item types (after configuration complete)
    - WFERROR, POERROR, OMERROR
    - Other workflows with high (current) count in WF\_ITEMS



# Item Attributes "As Needed"

- By default, when workflow initiated, runtime copy of each item attribute created
- 66% of item attributes have no value (and that excludes Event attributes)

```
SELECT  COUNT (*)
        ,v.item_type
  FROM wf_item_attribute_values v
        ,wf_item_attributes a
 WHERE a.item_type = v.item_type
       AND a.NAME = v.NAME
       AND a.TYPE <> 'EVENT'
       AND v.text_value IS NULL
       AND v.number_value IS NULL
       AND v.date_value IS NULL
 GROUP BY v.item_type
 ORDER BY 1 DESC;
```



# Item Attributes "As Needed"

- #ONDEMANDATTR
  - Process Activity Attribute
  - Assign to top-level runnable process activity
  - Can be any type, doesn't need a value, workflow engine just detects the presence of this attribute
  - Do not assign an item attribute as the value
  - Runtime copy only created when SetItemAttr<> used
    - If referenced prior to this call, default value used
  - Experiment with a particular workflow
    - HRSSA, XDPWFSTD, OEOL, WFERROR, APEXP, POWFRQAG, REQAPPRV



# Help for OEOH/OEOL

- My Oracle Support Notes
  - 398822.1 "Order Management Suite – Data Fix Script Patch"
  - 405275.1 "How to Detect Data Corruption and Purge More Eligible OEOH/OEOL Workflow Items for Order Management Workflow"
- Contain scripts to close unneeded OEOH/OEOL with associated OMERROR and WFERROR as well as close the records in the Order Management tables



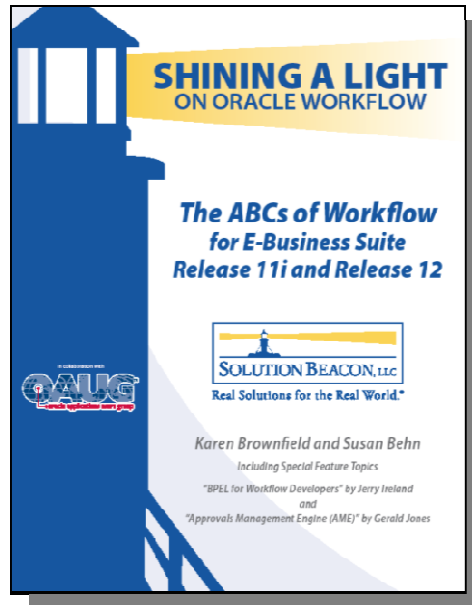


# Release 12.2

- Deferred Worklist Processing
  - Behavior when responding to notifications through worklist
    - Old – control not returned to screen until workflow ended or reached next deferred activity
    - New – control returned immediately, workflow continues when background engine runs again
  - Configurable by item type
- RAC Affinity for item types whose processes are either launched and completed in one online session or deferred once and completed later by a background engine – `WF_RAC_ENABLED_TYPES`



# 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



Karen Brownfield  
[Karen.Brownfield@roltasolutions.com](mailto:Karen.Brownfield@roltasolutions.com)