



Workflow Performance Tuning in Release 12

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About the Speaker

- Oracle Ace
- Over 35 years System Design and Support
- Over 20 years E-Business Suite support
- 13 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*

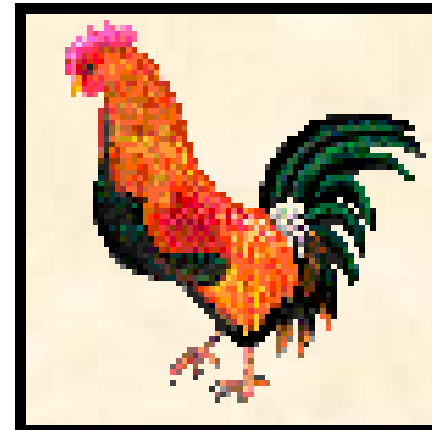


Audience Profile

- Job Role
 - DBA
 - System or Workflow Administrator
 - Functional
- Database Level
 - 10.2.0.5
 - 11g
- 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 or Solution Beacon site for latest list of patches

http://workflowsig.oaug.org/reference_info.html

<http://www.solutionbeacon.com/Patches.pdf>



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

- Can't purge while Error Item Type still open
 - WFERROR not the only Error Item Type
- 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
- 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



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 FNDCMMSG (notifications of finished concurrent requests)



Configure (Setup) Seeded Workflows

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



Background Engines

- Run Engine for Stuck separately at most once/day
 - 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
 - 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

- My Oracle Support Note 469702.1 "Workflow Background Process Takes Long Time to Run After Conversion To ATG Rup5 DB 10g"
 - If running 10gR2 database, must apply 10g Release 2 Interoperability patch for 11.5.10 (4653225)



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 Heath Check Diagnostic (R12)



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
 - 746313.1 "What should be the Correct Setting for Parameter AQ_TM_PROCESSES in E-Business Suite Instances"
 - 10g+ databases, Queue Monitoring can "auto-tune" if not set in database parameter file
 - » All std workflow queries will show value = 0, false reading
 - Never set value to 10, disables some Queue Monitoring features



Background Engine Runs a Long Time

- 560144.1 "11.5.10.4: Workflow Background Process Seems To Take Longer After Rup4" (cont)
 - JOB_QUEUE_PROCESSES at least 5
 - OAM recommends value of 10, use 10
 - Oracle seeds this to 2, it should be changed ASAP
 - Perform regular rebuilds/coalesces on all the indexes/IOTS
 - Follow steps in My Oracle Support 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"



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
 - FND: Debug Log Enabled – No
 - FND: Debug Log Level – Unexpected
 - FND: Debug Log Module – NULL
 - 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"



Diagnostic Workflow Health Check

Oracle Diagnostics Information	Parameters	Product Installation Status and Patchset Level
Installation	Profile Options	Show Database System Settings
Workflow Queue Information	Workflow Queue Index Information	Workflow Administrator Role
Verify the Status of the Workflow Service Components and Containers	Verify the Concurrent Tier Environment Settings For the Java Mailer	Verify Concurrent Programs Scheduled to Run
Verify Workflow Background Process(es) are Scheduled to Run	Verify Status of the Workflow Background Engine Deferred Queue Table	Verify Workflow Purge Programs are Scheduled to Run
Verify Wf Control Queue Cleanup Is Scheduled to Run	Check WF_DEFERRED Queue Table Counts	Verify aq\$.WF_DEFERRED Queue Table View
Verify the WF_NOTIFICATIONS Table Status	Verify the Counts in the WF_NOTIFICATION_OUT Queue	Check the Volume of Open & Closed Items Annually
Check the Volume of Open Items That Began Over 90 Days Ago	Check Top 30 Large Item Activity Status History Items	Check the Workflow Tablespace Footprint
Display all Invalid Objects	Verify Any Workflow Related Invalid Objects	Display Workflow Plsql Package Versions
JDK Information	Latest applied 'Workflow OWF' patchset	Latest applied 'Workflow ATG Rollup' patchset
Applications Technology Patches	Show Workflow File Versions	FND SQL File Versions
Workflow File Versions	References	XML File Information

- Profile Options
- Verify Status of the Workflow Background Engine Deferred Queue Table
- Check Top 30 Large Item Activity Status History Items
- Check the Volume of Open & Closed Items Annually
- Check the Volume of Open Items That Began Over 90 Days Ago



Diagnostic Workflow Health Check

- Available for 12.0.6 and 12.1.x
- Apply Patch 10373458
 - Supercedes 10134751 mentioned in MOS notes
- 11i equivalent tests
 - Workflow Status and Purgeable Items
 - Workflow Performance



Diagnostic Workflow Health Check

Profile Options [\[Top\]](#)

- Concurrent:GSM Enabled = "Y"
- WF: GUEST Access to Notification = "N"
- Guest User Password = "GUEST/ORACLE"
- FND: Debug Log Enabled = "Y"
- FND: Debug Log Filename for Middle-Tier is not set
- FND: Debug Log Level = "6"
- FND: Debug Log Mode = "2"
- FND: Debug Log Module = "%"
- FND: Framework Compatibility Mode = "11.5.10"
- FND Validation Level = "ERROR"
- FND: Migrated To JRAD = "Y"
- FND: Application Module Pool Enabled = "Y"
- Profile WF_BULK_RESPONSE does not exist

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

- 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'



Profile Options

- 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 MOSNote 472387.1 "FYI Notifications Closed Automatically and Not Showing Up on Worklist"



Diagnostic

Workflow Health Check

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](#)

- 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



Diagnostic Workflow Health Check

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 about 0 times a day.

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



Diagnostic Workflow Health Check

Check the Volume of Open & Closed Items Annually [\[Top\]](#)

ITEM_TYPE	DISPLAY_NAME	P_TYPE	P_DAYS	CLOSED	COUNT
XDPPROV	SFM Fulfillment Processes	PERM		2002	7
XDPWFSTD	SFM Standard	PERM		2003	15
ENGSTEP	Change Workflow Routing Step	PERM		2003	1
OKLAMPPT	OKL - AM : Termination Quote Acceptance	PERM		2003	1
GMSWF	GMS Workflow	PERM		2004	2
ENGCACT	Change Action	PERM		2008	2
ADSCUSTOM	ADS HR Custom Workflows	PERM		2008	1

- Open and Closed Items Annually
 - Section 1 – Closed Items with Persistence = Permanent
 - Run Purge program with correct Persistence parameter value



Diagnostic Workflow Health Check

- A summary view of all open and closed Workflow Items sorted by persistence type as found in WF_ITEMS table.

ITEMS	PERSISTENCE	COUNT
CLOSED	PERM	37
CLOSED	SYNC	74
CLOSED	TEMP	7067
OPEN	PERM	85
OPEN	SYNC	114
OPEN	TEMP	2774

6 rows retrieved
- [See SQL](#)
- Item types with a Persistence Type set to Synchronous means Oracle Workflow expects instances of that item type to be run as forced synchronous processes with an item key of #SYNCH. Forced synchronous processes complete in a single SQL session from start to finish and never insert into or update any database tables. Since no runtime status information is maintained, you do not normally need to perform any purging for a process with the Synchronous persistence type. However, if you run the process with a unique item key in asynchronous mode for testing or debugging purposes, Oracle Workflow does maintain runtime status information for that process instance. You can purge this information by changing the item types Persistence to Temporary and running any of the WF_PURGE APIs. Then change the item types Persistence back to Synchronous. For more details See: Synchronous, Asynchronous, and Forced Synchronous Processes, Oracle Workflow API Reference.
- A summary view of all closed Workflow Items by year with TEMP Persistence as found in WF_ITEMS table.

- Open and Closed Items Annually
 - Section 2 – How to Deal with Persistence = SYNC



Diagnostic Workflow Health Check

- A summary view of all closed Workflow Items by year with TEMP Persistence as found in WF_ITEMS table.

STILL_THERE	COUNT
2002	13
2003	5365
2004	182
2005	3
2008	1451
2009	94
2010	70

7 rows retrieved

- [See SQL](#)
- Looking at the oldest data in WF_ITEMS, shows currently there are still 13 items from 2002. These items were closed as far back as 2002-06
- Looking at the largest group of closed TEMP items, reveals 4939 closed OEOL (TEMP Persistence) items still stored in the Workflow Runtime Tables. Of these 4939 closed items, 4070 are purgeable.

- Open and Closed Items Annually
 - Section 3 – Closed by year with count of how many are purgeable



Diagnostic Workflow Health Check

CLOSED_TEMP_ITEMS	PURGEABLE	ITEM_TYPE	DISPLAY_NAME
4939	4070	OEOL	OM Order Line
1269	1267	OEOL	OM Order Header
418	88	WFERROR	System: Error
317	317	OAM_BE	OAM Business Exception
76	76	ASXSLASW	Monitoring Engine Workflow
10	1	HRSSA	HR
8	8	CREATEPO	PO Create Documents
6	6	IRC_WF	iRecruitment
5	0	POERROR	PO Approval Error
5	5	REQAPPRV	PO Requisition Approval
3	3	AMEUPDUN	AME update FND user name
3	3	PVXSLENW	POL Automated Partner Matching
2	2	APEXP	Expenses
2	2	OKSARENW	OKS Autorenew
1	1	POXML	PO Xml Delivery
1	0	DOSFLOWE	Dossier Approval Flow Enhanced
1	1	POAPPRV	PO Approval
1	1	CNCOMPPR	Compensation Plan Processing

18 rows retrieved

• [See SQL](#)

- Open and Closed Items Annually
 - Section 4 –Closed Items not eligible for purging – MOS Note 186361.1 “Workflow Background Process Performance Tuning Guide”



Diagnostic Workflow Health Check

Check the Volume of Open Items That Began Over 90 Days Ago [\[Top\]](#)

ITEM_TYPE	DISPLAY_NAME	TO_CHAR(WI.BEGIN_DATE,YYYY)	COUNT
OKCAUKAP	Contract Approval	2000	2
APEXP	Expenses	2000	1
GLALLOC	GL AutoAllocation	2000	1
HRSSA	HR	2000	113
OEOCGS	OM : Generate Cost of Goods Sold Account	2000	1

- [See SQL](#)

WARNING - There are 14027 open item_types in WF_ITEMS table that were opened over 90 days ago.

Remember that each single row in WF_ITEMS can represent 100s or 1000s of rows in the subsequent Workflow Runtime tables, so it is important to close these open workflows once completed so they can be purged.

ACTION - There may be business reasons why OPEN items still exist after 90 days so that should be taken into consideration.

If this is not the case, then please review [Note 144806.1 - A Detailed Approach To Purging Oracle Workflow Runtime Data](#) for details on how to drill down to discover the reason why these items are still open, and ways to close them so they can be purged.

- Open Items That Began Over 90 Days Ago
 - Take action appropriate to workflow and age



Notification Mailer

System	Source Type	Out Agent	To Agent Function	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

Click icon, change Status to Disabled

- 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**
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 * Container Workflow Mailer Service
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 * 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 suddently (sic) Stop Receiving Email Notifications"
 - Insufficient Heap Size (Xmx and Xms)
 - Edit \$APPL_TOP/admin/adovars.env
 - Add/change following
 - » APPSJREOPT="-Xms128m -Xmx3072m"
 - » export APPSJREOPT
 - Bounce Concurrent Managers



Notification Mailer

- "You Have Insufficient Privileges"
 - 414376.1 ""You Have Insufficient Privileges For The Current Operation" On Reqapprv Notif"
 - For user assigned to Mailer
 - Must be workflow administrator
 - Profile Options to ensure Mailer session persists
 - ICX:Session Timeout 12000
 - ICX: Limit time 192
 - ICX: Limit connect 1000000
 - Bounce Mailer at least weekly
 - Can schedule events to perform this



Notification Mailer

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

- "You Have Insufficient Privileges" (cont)
 - Framework URL timeout = 120
 - See "Workflow Troubleshooting" for detailed explanation



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'

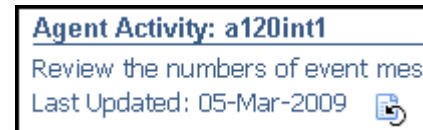


Workflow Statistics Programs

- 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



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 MOSNote 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



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



Synchronizing WF LOCAL tables

- Always run with Logging Mode parameter = LOGGING
 - Yes, faster with NOLOGGING, however, database recovery may result in data block corruption
 - Bug causes database to mark partition NOLOGGING, following Doc. IDs provide script to ensure all partitions remain LOGGING
 - 433280.1 "Partitions in Workflow Local Tables are Automatically Switched to NOLOGGING"
 - 369535.1 "During a Backup, WF_LOCAL_ROLES Is Showing Corrupt Block"



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;
```



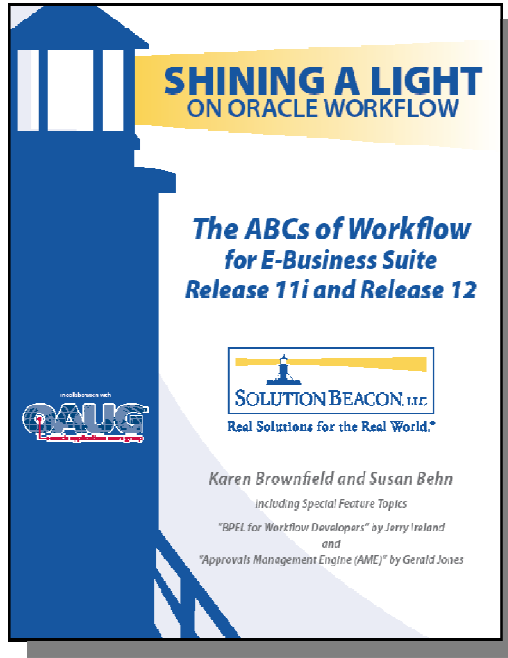
Item Attributes "As Needed"

- #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

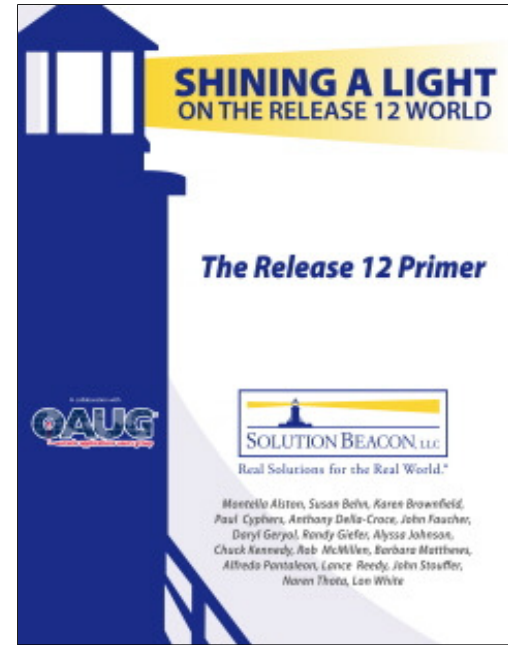


Help for OEOH/OEOL

- 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



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



Workflow Performance Tuning

- A thorough, systematic “tune up” to:
 - Identify critical patches
 - Check WF Errors and document remediations
 - Validate setups
 - Recommend performance improvements
- Options
 - Report Only
 - Full remediation in Test environment
 - Full remediation in Production

Workflow Performance Tuning should be done as needed to keep your IT Systems running smoothly



Like an automobile, your Oracle System needs a periodic tune up to ensure optimal performance.

STOP BY
**BOOTH
1256**



Questions and Answers

Thank You!

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