

**Edition highlights:**

Successful Troubleshooting  
with Oracle GoldenGate

New Feature -  
We ask you to Ask Jonathan!

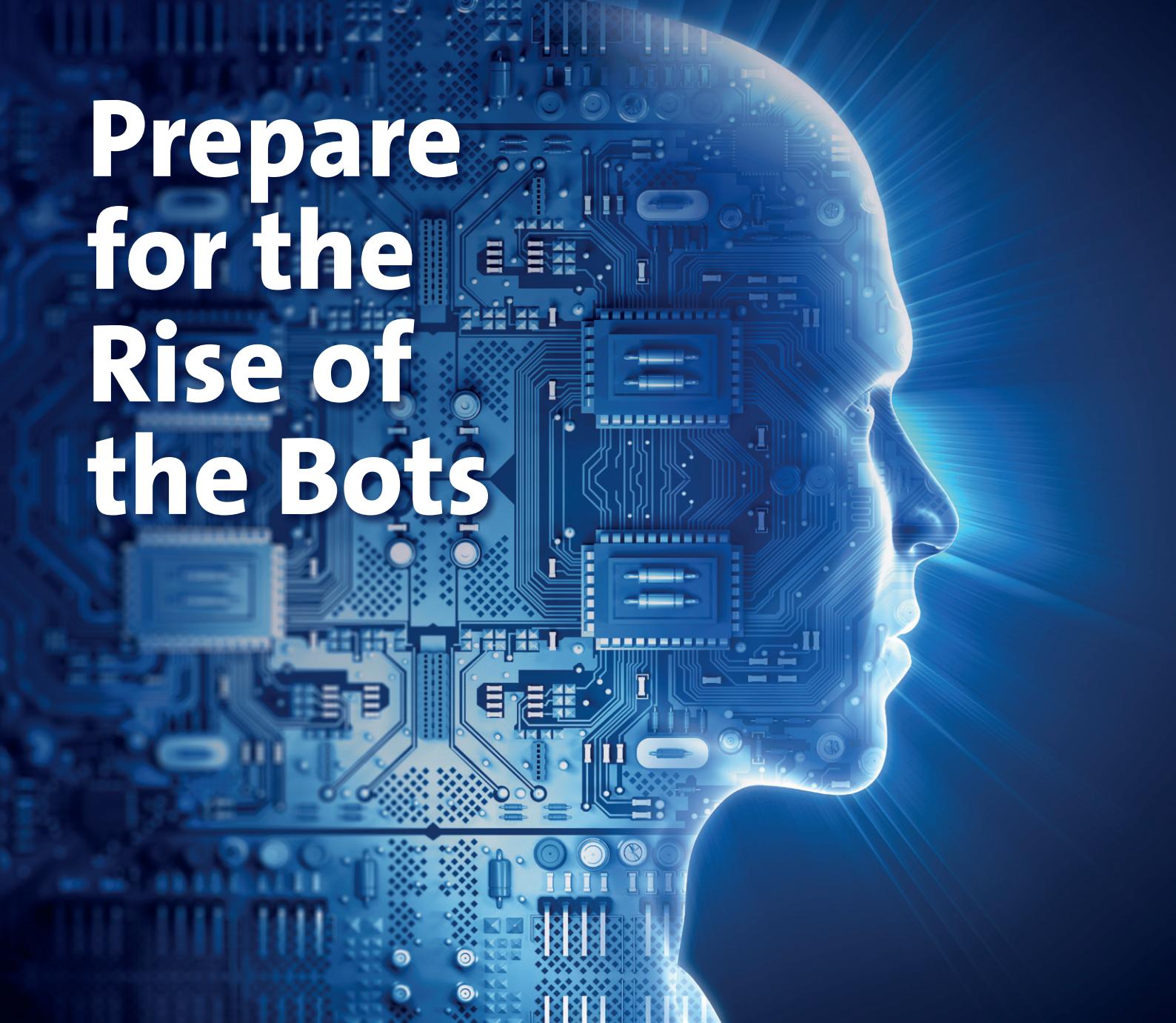
Telling a Story with  
Good Dashboard Design

Introducing ABCS to  
Self-Service HCM SaaS

# OracleScene

#OracleScene

Summer 17 | Issue 64



**Prepare  
for the  
Rise of  
the Bots**

[www.ukoug.org](http://www.ukoug.org)

An independent publication not  
affiliated with Oracle Corporation

**UKOUG**  
UK ORACLE USER GROUP

SUMMER 17

Welcome to Oracle Scene

# Inside this issue

## Oracle Scene Editorial Team

**Editor:** Martin Widlake  
**Email:** editor@ukoug.org

**Outgoing Editor:** Brendan Tierney

**Deputy Editor (Apps):** Khalil Rehman  
**Deputy Editor (Apps):** Toby Price

**Deputy Editor (Tech):** Alan McClean  
**Deputy Editor (Tech):** Nicholas Shearer

**UKOUG Contact:** Karen Smith  
**Email:** karen@ukoug.org

**Sales:** Kerry Stuart  
**Email:** kerry.stuart@ukoug.org

## UKOUG Governance

A full listing of Board members, along with details of how the user group is governed, can be found at:  
[www.ukoug.org/about-us/governance](http://www.ukoug.org/about-us/governance)

## UKOUG Office

UK Oracle User Group, User Group House,  
591-593 Kingston Road, Wimbledon  
London, SW20 8SA

**Tel:** +44 (0)20 8545 9670  
**Email:** info@ukoug.org  
**Web:** [www.ukoug.org](http://www.ukoug.org)

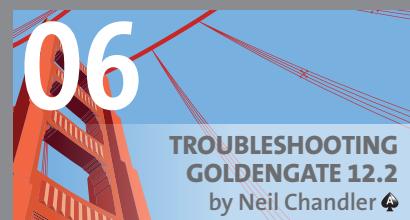
## Produced and Designed by

**Why Creative**  
**Tel:** +44 (0)7900 246400  
**Web:** [www.whycreative.co.uk](http://www.whycreative.co.uk)

## Next Oracle Scene Issues

**Issue 65:** September 2017  
Content deadline: 26th June

**Issue 66:** December 2017  
Content deadline: 4th September



## TECHNOLOGY

- |  |    |
|--|----|
| <b>An Optimal Approach to Sitting Oracle Certifications</b> by Rainer Schaub | 24 |
| <b>Ask Jonathan</b> by Jonathan Lewis  | 40 |

## APPLICATIONS

- |  |    |
|--|----|
| <b>Extending Cloud HCM is as Easy as ABC's</b> by Debra Lilley   | 32 |
| <b>Three Reasons Companies are Outsourcing Management of Their Oracle Hyperion EPM/BI Systems</b> by Martin Greenshields | 35 |
| <b>How to Cook a BI Story</b> by Federico Venturin   | 36 |

## UKOUG

- |                                    |    |
|------------------------------------|----|
| <b>UKOUG Strategy Project 2017</b> | 13 |
| <b>UKOUG 2017 Conferences</b>      | 18 |

## REGULAR FEATURES

- |                           |    |
|---------------------------|----|
| <b>News &amp; Reviews</b> | 04 |
|---------------------------|----|

More than 17,000 people follow UKOUG.

Join them now. @UKOUG

**OracleScene® UK Oracle User Group Ltd**  
The views stated in Oracle Scene are the views of the author and not those of the UK Oracle User Group Ltd. We do not make any warranty for the accuracy of any published information and the UK Oracle User Group will assume no responsibility or liability regarding the use of such information. All articles are published on the understanding that copyright remains with the individual authors. The UK Oracle User Group reserves the right, however, to reproduce an article, in whole or in part, in any other user group publication. The reproduction of this publication by any third party, in whole or in part, is strictly prohibited without the express written consent of the UK Oracle User Group. Oracle is a registered trademark of Oracle Corporation and/or its affiliates, used under license. This publication is an independent publication, not affiliated or otherwise associated with Oracle Corporation. The opinions, statements, positions and views stated herein are those of the author(s) or publisher and are not intended to be the opinions, statements, positions, or views of Oracle Corporation.

More information on submitting an article can be found online at:  
[www.ukoug.org/oraclescene](http://www.ukoug.org/oraclescene)

**OracleScene**  
D I G I T A L

View the latest edition online and join UKOUG to access the archive:  
[www.ukoug.org/os](http://www.ukoug.org/os)

# First word

This summer 2017 edition of Oracle Scene brings the same great mix of Oracle Tech and Apps content but with a slight change behind the scenes. After 6 years sailing the ship first as Oracle Scene deputy editor then editor, Brendan Tierney is passing over the helm to myself.

Brendan was recently voted in to the UKOUG board as the new Member Advocate – a significant position with a lot of responsibilities. It is impossible for him to hold this role and also be the editor of Oracle Scene so I have stepped up from deputy editor to the role of Editor. Thank you, Brendan, for all your work over the last few years in not only producing Oracle Scene so regularly but also improving both the content and process. In related news, I have a strong crew to help me. As well as Karen Smith in the UKOUG office and Toby Price as Apps deputy editor, we have Alan McClean, Khalil Rehman and Nicholas Shearer as deputy editors also. This gives us a strong team to encourage, review and select content.

Something some people do not realise is that that Oracle Scene is a ship that sails under its own flag. UKOUG is an independent user group and this publication, produced by the UKOUG, is just as independent. We have a good working relationship with Oracle Corporation, we often have content from Oracle employees (as we do this month) as well as from their official communication teams. And of course, we are all passionate about Oracle Tech and Oracle Apps. But we are a user-focused organisation and community. We are always interested in what Oracle is doing and what the official Oracle view is on anything – but in the end our primary concern is with our end user community and what we think we can do to best support it. That of course includes working with Partners to bring you information about what they can offer. What we publish is not controlled by Oracle. Everything is chosen or approved by the editorial team.

Still keeping to the questionable nautical theme, our co-located conferences Apps17, JDE17 and Tech17 will be taking place at the start of December. At the time of this edition's publication, the Call for Papers will still be open -closing on 26th June. Why not be part of this fantastic event and share your experiences/knowledge of Oracle? See pages 18-19 for more information.

As ever we have a selection of articles across both Apps and Tech. As the cover proclaims, Grant Ronald has a thought-provoking article on how automated systems (robots) are using machine learning, neural networks and deep data to provide new, interactive services to web applications. This is a new area for Oracle to be involved in and future articles will track progress in this arena. Another thought provoking article is by Federico Venturin on how he designs dashboards – giving it a flow and structure and not trying to put everything on one page.

On the tech side Neil Chandler continues his series on GoldenGate, discussing how you troubleshoot issues. A new Tech highlight is the series by renowned expert Jonathan Lewis, answering questions on the RDBMS technology. If you have a question about "How Oracle Works" then send them to us and Jonathan may answer it in a future edition.

All in all there should be something for everyone involved in the Oracle sphere.

Enjoy! ■



## ABOUT THE EDITOR

**Martin Widlake** ♀

Database Architect & Performance Specialist, ORA600

An independent consultant specialising in Oracle database design, performance and making systems work better. Martin has been working with Oracle technology for half his life. Despite this he is passionate about user groups, sharing knowledge and explaining how Oracle works. He is a regular conference presenter both in the UK and internationally. Martin is an Oracle ACE and a member of the OakTable Network. His blog is part technical, part management and part just musing on working in I.T. His real passion is genetics. And cats.

**Blog:** [mwidlake.wordpress.com](http://mwidlake.wordpress.com)



[uk.linkedin.com/pub/martin-widlake/2/7a2/8b/en](https://uk.linkedin.com/pub/martin-widlake/2/7a2/8b/en)



@MDWidlake

SUMMER 17  
News & Reviews

# UKOUG LICENCE MANAGEMENT 2017

24 OCTOBER 2017 | CAVENDISH CONFERENCE CENTRE, LONDON

#ukoug\_lme

If you have any concerns or just want to confirm your understanding in this area – head to UKOUG's Licence Management Event this October.

We've gathered the industry's knowledgeable presenters to deliver an agenda that can answer all your questions and alleviate your worries.

With topics covered such as: Auditing, Architecting for Oracle License Optimisation and Compliance; as well as key things your organisation should be doing to better manage its Oracle

Does Oracle licensing still send shivers through your business?  
Do you know who to ask for help and do you feel confident in their answers?

licenses, contracts and vendor relationship – attending this event will be a day out of the office well spent. The event has a strict code of conduct too so you can rest assured your questions remain confidential.

Head to [www.ukoug.org/lme](http://www.ukoug.org/lme) to find out more and book your place.

## Start Saving



## With a UKOUG Membership

Investing in a UKOUG membership is the most cost-effective way to attend UKOUG events, conferences & SIGs and the more you use it the more your business saves and your team benefits.

The knowledge, experience and insight presented at these events is priceless for improving your day to day processes & delivery and enabling you to take the right steps to plan for the future.

Find out more about membership at [www.ukoug.org/membership](http://www.ukoug.org/membership)

## Live it, Learn it, Love it

UKOUG's Special Interest Group meetings are the place to head to meet your industry peers, research your next partner and pose your questions to representatives from Oracle.

Take a look to see what's upcoming on our calendar and what you could be benefitting from.

June	July
13th UKOUG Oracle Financials SIG Radisson Blu Hotel, Birmingham	5th UKOUG Middleware & Integration SIG Oracle, Thames Valley Park, Reading
15th UKOUG Spatial & Graph SIG Oracle, Thames Valley Park, Reading	12th UKOUG Public Sector HCM SIG Workshop Oracle, Blythe Valley Park, Solihull
27th UKOUG Public Sector Applications & Financials SIG Oracle, Blythe Valley Park, Solihull	
September	
14th UKOUG Development SIG Oracle, Thames Valley Park, Reading	21st UKOUG Public Sector HCM SIG Oracle, Blythe Valley Park, Solihull
19th UKOUG Oracle Financials SIG Birmingham	26th UKOUG Business Analytics SIG Oracle City Office, London
20th UKOUG Apps Tech SIG Oracle, Thames Valley Park, Reading	27th UKOUG RAC Cloud, Infrastructure & Availability SIG Oracle City Office, London
20th UKOUG Higher Education SIG Oracle City Office, London	28th UKOUG Middleware & Integration SIG Oracle City Office, London

For the full calendar visit [www.ukoug.org/events](http://www.ukoug.org/events)

All information correct at time of print

# MEET ORACLE CUSTOMERS IN BIRMINGHAM THIS DECEMBER

UKOUG Conferences not only offer the **ideal opportunity** to **showcase your products & solutions** and get up to speed with **new developments** in the industry...

## YOU CAN...

- **Meet and connect with prospective customers**
- Over 1,800 attendees expected from all aspects of the Oracle world
- **Strengthen your bond with existing customers**
- Meet face-to-face rather than just engaging over email & telephone
- **Raise your profile / establish your brand**
- Position your business as a leader in the industry on an equal platform with your competitors
- **Get feedback from your target market**
- Speak directly to your market and utilise this valuable insight to strengthen your sales strategy

To find out more and to discuss how UKOUG can work for your business, contact Kerry Stuart at:  
[kerry.stuart@ukoug.org](mailto:kerry.stuart@ukoug.org) or call +44(0)20 8545 9685

## Calling future Oracle Scene authors

If you're enjoying what you're reading and it's inspired you to become an Oracle Scene author – good news, our call for articles for the autumn edition is currently open.

Submit your full article by 09:00, 26th June 2017.

Articles will be reviewed by an editorial review panel before final selection is made by the editorial team.

If you'd like to send a short abstract for feedback from the editorial team, please send it to [editor@ukoug.org](mailto:editor@ukoug.org), but don't leave it till the last minute as we'll still need to receive the full article by the June deadline.

For more further information on themes for the next issue head to [www.ukoug.org/oraclescene](http://www.ukoug.org/oraclescene)

## OracleScene



# Troubleshooting GoldenGate 12.2

In my previous article ([Getting Started with Oracle GoldenGate, Oracle Scene, Spring 2017](#)) I explained how to setup a basic GoldenGate replication. Hopefully you were able to follow the instructions and setup the replication without a problem. However, problems do happen. You will make mistakes in the parameter files, data will change in unexpected ways or your application may do something naughty (like updating a primary key). You may hit an external threat, such as a server configuration error, memory or process limits, or a corruption or bug. Here I cover how to begin troubleshooting these issues.

Neil Chandler, Data Architect, Chandler Systems 

To troubleshoot successfully, you need to be able to answer a few questions: How do I know something has gone wrong? When things go wrong, how do I work out what went wrong and how do I correct it whilst maintaining data integrity?

## Validating Parameter Files

A new context sensitive command “`chkprm`” was introduced in 12.2 to pre-validate your parameter files, improving upon the ineffective `CHECKPARAMS` parameter:

```
$ checkprm dirprm/e_hr.prm --COMPONENT EXTRACT --MODE
"Integrated Extract"

2017-04-10 14:56:47 INFO OGG-10139 Parameter file dirprm/e_
hr.prm: Validity check: PASS.

Runtime parameter validation is not reflected in the above
check.

$ checkprm dirprm/e_hr.prm --COMPONENT REPLICAT --MODE
"Integrated Replicat"

(e_hr.prm) line 7: Parameter ['e_hr'] is not valid for this
configuration.

2017-04-10 14:56:51 INFO OGG-10139 Parameter file dirprm/e_
hr.prm: Validity check: FAIL.
```

Running with the “`--VERBOSE`” option provides detailed output for every command in the file.

```
$ checkprm dirprm/e_hr.prm --COMPONENT EXTRACT --MODE
"Integrated Extract" --verbose

2017-04-23 01:47:02 INFO OGG-02095 Successfully set
environment variable ORACLE_HOME=/home/oracle/app/oracle/
product/12.1.0/dbhome_1.
2017-04-23 01:47:02 INFO OGG-02095 Successfully set
environment variable ORACLE_SID=cdb1.

Parameter file validation context:

component(s): EXTRACT
mode(s) : Integrated Extract
platform(s) : Linux
database(s) : Oracle 12c

GLOBALS

ggschema : goldengate
checkpointtable : goldengate.checkpoint_
table
heartbeat_table : gg_heartbeat
enableheartbeat : <enabled>
syslog : <enabled>
warn : <enabled>
error : <enabled>

dirprm/e_hr.prm

setenv : (ORACLE_HOME='/home/
oracle/app/oracle/product/12.1.0/dbhome_1')
setenv : (ORACLE_SID='cdb1')
extract : e_hr
userid : c##goldengate
password : *****
report : <enabled>
AT : 23:59
reportrollover : <enabled>
AT : 00:01
ON : MONDAY
reportcount : <enabled>
every : 5 minute(s)
rate : <enabled>
every : 100000
rate : <enabled>
extrail : ./dirdat/AA
updateformat : COMPACT
ddl : <enabled>
include : <enabled>
all : <enabled>
ddloptions : <enabled>
report : <enabled>
table : orcl.hr.*

2017-04-23 01:47:02 INFO OGG-10139 Parameter file dirprm/e-
hr.prm: Validity check: PASS.
Runtime parameter validation is not reflected in the above
check.
```

## Identifying Problems

Problems generally fall into two camps; it is working too slowly (lag), or it has stopped working completely with a status of ABEND (which is an abbreviation of Abnormal End).

We need to be informed when there are problems and errors. There are cost options available from Oracle to do this; you can purchase an OEM Plug-in and a dedicated GoldenGate Monitoring server, or you could code your own monitoring system by checking the output from ggsci commands. GoldenGate writes all of its messages to file \$GG\_HOME/ggserr.log and then duplicates them in your SYSLOG. On a Linux system that would mean they are all also written to /var/log/messages, where you can use industry standard tools such as log aggregators to identify and alert problems in a more cost effective way.

We can control the amount of information being sent to syslog with the GLOBALS command SYSLOG as by default it sends everything.

## \$GG\_HOME/GLOBALS

```
--GLOBALS
ggschema goldengate
checkpointtable goldengate.checkpoint_table

-- Enable HeartBeat table for Lag Monitoring
heartbeat_table gg_heartbeat
enable_heartbeat_table

-- Only send WARN and ERROR output to SYSLOG
SYSLOG WARN, ERROR
```

We are also able to enhance the information being logged by GoldenGate to keep reporting when processes are down, and to report when we have lag problems. These are added to the Manager Parameter file:

## \$GG\_HOME/dirprm/mgr.prm

```
--/u01/app/goldengate/dirprm/mgr.prm
PORT 7809 -- listener port
DYNAMICPORTLIST 7810-7830 -- port range for spawned server
"collector" processes

-- Cleanup Old Trail Files
PURGEOLDEXTRACTS /u01/app/gg12/dirprm/AA, USECHECKPOINTS

-- Automatically Start all Extract and Replicats
AUTOSTART ER *

-- Automatically try to re-Start all Extract and Replicats if
they ABEND
-- This will help with temporary (network) outages between
servers
AUTORESTART ER *, RETRIES 5, WAITMINUTES 1, RESETMINUTES 60

-- Intervals at which problems should be written to the ggserr.
log file
DOWNREPORTMINUTES 15 -- Report every 15 minutes that processes
are down
LAGREPORTMINUTES 5 -- Interval at which lag is checked
LAGINFOMINUTES 5 -- Threshold at which lag is reported as
INFO
LAGCRITICALMINUTES 15 -- Critical lagging reporting value,
written as WARN not INFO
```

## LAG

If a DATAPUMP or REPLICAT has not received any transactions, it may report as LAGGING when it actually has no data to process. False lagging can be identified by performing a LAG command in ggsci to see if the status "At EOF, no more records to process." is returned, meaning there are no more records left to process in the Trail File.

With the examples below, the datapump (P\_HR) is not really lagging but is "complete". The REPLICAT (R\_HR) is still processing with lag.

```
GGSCI > lag p_hr
```

```
Sending GETLAG request to EXTRACT P_HR ...
Last record lag 25 seconds.
At EOF, no more records to process.
```

```
GGSCI > lag r_hr
```

```
Sending GETLAG request to REPLICAT R_HR ...
Last record lag 30 seconds.
Low watermark lag: 135.
High watermark lag: 43.
Low watermark position: 6367307.
High watermark position: 6367307.
```

SUMMER 17

## Technology: Neil Chandler

### The Report File: Identifying Errors

When a group ABENDs the first place to look for the cause is the report file. You can either view it from the O/S (on Linux in \$GG\_HOME/diirprt/<group-name>.rpt), or with the ggsci command "view report <group-name>".

```
GGSCI > info all
Program      Status      Group      Lag at Chkpt  Time Since
Chkpt

MANAGER      RUNNING      R_HR      00:00:26   00:00:09

GGSCI > view report r_hr
.
.
2017-04-09 02:03:34 INFO    OGG-02095 Successfully set environment variable ORACLE_HOME=/u01/app/oracle/product/12.1.0/dbhome_1.
2017-04-09 02:03:34 INFO    OGG-02095 Successfully set environment variable TWO_TASK=orcltarget.

*****
          Oracle GoldenGate Delivery for Oracle
          Version 12.2.0.1.1 OGGCORE_12.2.0.1.0_
PLATFROMS_151211.1401_FBO
Linux, x64, 64bit (optimized), Oracle 12c on Dec 12 2015
03:29:37
.
.
[snip - there's a lot of information in this report!]
```

This will give the first indication of why the failure happened. The most common failure in a running system is when the REPLICAT attempts a data manipulation which cannot be completed, such as updating a non-existent row. If you have setup a discard file in each group with the DISCARDFILE command, this file will contain the problematic row associated with any data-based ABEND.

-- Key file used to show failed records. Needed when troubleshooting problems.  
DISCARDFILE ./diirprt/R\_HR.dsc, PURGE

For example, if we tried to update a row which did not exist, we can see here how to identify the problem:

```
In the Source:
03:22:04 HR @ orcl > select * from regions;
REGION_ID REGION_NAME
-----
1 Europe
2 Americas
3 Asia
4 Middle East and Africa
5 Antarctica

03:22:14 HR @ orcl > update regions set region_name =
'Penguinia' where region_id = 5;
1 row updated.

03:22:47 HR @ orcl > commit;
Commit complete.

03:23:04 HR @ orcl > select * from regions;
REGION_ID REGION_NAME
-----
1 Europe
2 Americas
3 Asia
4 Middle East and Africa
5 Penguinia
```

### At the Target

```
GGSCI > info all
Program      Status      Group      Lag at Chkpt  Time Since
Chkpt
MANAGER      RUNNING      ABENDED      R_HR      00:00:28   00:01:09

GGSCI > view report r_hr
.
.
2017-04-09 03:23:11 INFO    OGG-06510 Using the following key columns for target table ORCLTARGET.HR_TARGET.REGIONS: REGION_ID.

2017-04-09 03:23:18 WARNING OGG-02544 Unhandled error (ORA-26787: The row with key ("REGION_ID") = (5) does not exist in table HR_TARGET.REGIONS
ORA-01403: no data found
ORA-01403: no data found) while processing the record at SEQNO 24, RBA 49020 in Integrated mode. REPLICAT will retry in Direct mode.

2017-04-09 03:23:18 WARNING OGG-01154 SQL error 1403 mapping ORCL.HR.REGIONS to ORCLTARGET.HR_TARGET.REGIONS OCI Error ORA-01403: no data found, SQL <UPDATE "HR_TARGET"."REGIONS" x SET x."REGION_NAME" = :a3 WHERE x."REGION_ID" = :b0>.

[snip - we don't need to see the java dump]

2017-04-09 03:23:18 ERROR    OGG-01296 Error mapping from ORCL.HR.REGIONS to ORCLTARGET.HR_TARGET.REGIONS.

*****
*****
```

So we can see that the target row for update does not exist (because I deleted it earlier). We can also see that GoldenGate slowed itself down and did a "direct" update (i.e. ran the SQL for the transaction serially) instead of an "integrated" update (using Streams Logical Change Record processing) in case the LCR processing was causing the problem. Integrated Replicat processing can take some shortcuts to aid performance but will revert to standard processing if this causes problems.

If we look in the discard file, we can see the full record which is failing:

```
$ cat /u01/app/goldengate/diirprt/R_HR.dsc
Oracle GoldenGate Delivery for Oracle process started, group R_HR discard file opened: 2017-04-09 02:03:34.672526
Current time: 2017-04-09 03:23:18
Discarded record from action ABEND on error 1403

OCI Error ORA-01403: no data found, SQL <UPDATE "HR_TARGET"."REGIONS" x SET x."REGION_NAME" = :a3 WHERE x."REGION_ID" = :b0>
Aborting transaction on /u01/app/goldengate/dirdat/AA beginning at seqno 24 rba 49020
                           error at seqno 24 rba 49020
Problem replicating ORCL.HR.REGIONS to ORCLTARGET.HR_TARGET.REGIONS
Record not found
Mapping problem with unified update record (target format)...
*
REGION_ID = 5
000000: 35                                         |5
REGION_NAME = Antarctica
000000: 41 6e 74 61 72 63 74 69 63 61           |Antarctica
REGION_ID = 5
000000: 35                                         |5
REGION_NAME = Penguinia
000000: 50 65 6e 67 75 69 6e 69 61             |Penguinia
*

Process Abending : 2017-04-09 03:23:25
```

We can see that this is a unified update record containing the before and after image in the same record (essential if we have an application which updates Primary Keys).

We also get information about where this transaction is held in the trail files;

**Trail File /u01/app/goldengate/dirdat/  
AA000000024 relative block address 49020**

```
$GG_HOME/logdump

Oracle GoldenGate Log File Dump Utility for Oracle
Version 12.2.0.1.1 OGGCORE_12.2.0.1.0_PLATFORMS_151211.1401
Copyright (C) 1995, 2015, Oracle and/or its affiliates. All rights reserved.

Logdump >open ./dirdat/AA000000024
Current LogTrail is /u01/app/goldengate/dirdat/AA000000024
Logdump >pos 49020
Reading forward from RBA 49020
Logdump >ghdr on
Logdump >detail data
Logdump >rec

Hdr-Ind : E (x45) Partition : . (x0c)
UndoFlag : . (x00) BeforeAfter: A (x41)
RecLength : 57 (x039) IO Time : 2017/04/09 03:23:03.909.599
IOType : 134 (x86) OrigNode : 255 (xff)
TransInd : . (x03) FormatType : R (x52)
SyskeyLen : 0 (x00) Incomplete : . (x00)
AuditRBA : 145 AuditPos : 33093136
Continued : N (x00) RecCount : 1 (x01)

2017/04/09 03:23:03.909.599 GGSUnifiedUpdate Len 57 RBA 49020
Name: ORCL.HR.REGIONs (TDR Index: 3) Partition 12 G s
After Image: .....5.....
0000 001b 0000 0005 0000 0001 3500 0100 0e00 0000 | .....
0a41 6e74 6172 6374 6963 6100 0000 0500 0000 0135 | .Antarctica.....5
0001 000d 0000 0009 5065 6e67 7569 6e69 61 | .....Penguinia
Before Image Len 31 (x0000001f)
BeforeColumnLen 27 (x0000001b)
Column 0 (x0000), Len 5 (x0005)
0000 0001 35 | ....5
Column 1 (x0001), Len 14 (x000e)
0000 000a 416e 7461 7263 7469 6361 | ....Antarctica

After Image Len 26 (x0000001a)
Column 0 (x0000), Len 5 (x0005)
0000 0001 35 | ....5
Column 1 (x0001), Len 13 (x000d)
0000 0009 5065 6e67 7569 6e69 61 | ....Penguinia
```

The transaction indicator (TransInd) value “x03” shows that this is the only record in this transaction. It may also be set to x00 – Start of transaction, x01 – mid-transaction or x02 last record in transaction, but because it is x03 we know we can fix this update in isolation without implications for other data in the transaction. Logdump is a comprehensive tool to examine trail files but we should not need to use it on a regular basis. Learning how to use the filter, search and display options can significantly help usability rather than slowly progressing through huge quantities of data line-by-line.

## Fixing the Data

When it comes to fixing this particular transaction, you have some choices.

1. Correctly synchronise the data again between source and target
2. Update the target database so the transaction will work
3. Skip the next transaction by restarting the replicat with “skiptransaction” [NOTE: That is every record in the transaction, not just the problem record]
4. Skip multiple transaction records by restarting the replicat with a new “RBA”

```
alter replicat r_hr extrba nnnn
or
start replicat AFTERCSN n
```

## 5. Cheat, and switch on HANDLECOLLISIONS

Only options 1 and possibly 2 will mean the replicated data is correct. Most people cheat, and switch on HANDLECOLLISIONS in the parameter file. If you do this, GoldenGate will not ABEND due to data errors, but you may be corrupting your data. There are a long list of rules which HANDLECOLLISIONS use to minimise the data corruption, but it is not perfect and you must not run in Production with this enabled if you care about the integrity of your data.

SUMMER 17

## Technology: Neil Chandler

```
GGSCI > info all
Program      Status      Group      Lag at Chkpt  Time Since
Chkpt

MANAGER      RUNNING
REPLICAT    ABENDED     R_HR       00:00:14    00:00:43

GGSCI > edit param r_hr
-- /u01/app/goldengate/dirprm/r_hr.prm
-- Setup Environment Variables so we login to the database
correctly
SETENV (ORACLE_HOME='/u01/app/oracle/product/12.1.0/dbhome_1')
SETENV (TWO_TASK='orcltarget')
-- name the replicat
REPLICAT r_hr
-- Login to the DB
USERID goldengate PASSWORD goldengate
-- Add our standard reporting options for every extract and
replicat
include /u01/app/goldengate/dirprm/i_report.prm
HANDLECOLLISIONS
-- Controlling REPLICAT memory use and parallelism
DBOPTIONS INTEGRATEDPARAMS (max_sga_size 200, parallelism 1)
-- Key file used to show failed records. Needed when
troubleshooting problems.
DISCARDFILE ./dirrpt/R_HR.dsc, PURGE
DDL INCLUDE MAPPED
-- This is how we map the tables across from source to target
MAP orcl.hr.* , TARGET hr_target.*;
GGSCI > start r_hr
Sending START request to MANAGER ...
REPLICAT R_HR starting
GGSCI > info all
Program      Status      Group      Lag at Chkpt  Time Since
Chkpt

MANAGER      RUNNING
REPLICAT    RUNNING     R_HR       00:00:14    00:01:09

(once the transaction is applied)

GGSCI > send replicat r_hr nohandlecollisions
Sending NOHANDLECOLLISIONS request to REPLICAT R_HR ...
R_HR NOHANDLECOLLISIONS set for 2 tables and 4 wildcard
entries.

GGSCI > edit param r_hr
(to remove the HANDLECOLLISIONS for the next restart)

And in the Target Database the UPDATE has been converted to an INSERT:
HR_TARGET @ orcltarget SQL > select * from regions

REGION_ID REGION_NAME
-----
1 Europe
2 Americas
3 Asia
4 Middle East and Africa
5 Penguinia
```

### TROUBLESHOOTING TIP:

If an EXTRACT or REPLICAT group fails with no error output in the report file and then continues to fail silently on restart, try starting it manually from the command line using the **extract** or **replicat** command directly instead of via **ggsci**. This may show additional O/S-level errors, such as process fork or memory problems which may not get captured to the report file.

### Lag Details – Adding the HEARTBEAT Functionality

One of the hardest things to identify with GoldenGate was where a LAG problem was located. From GoldenGate 12, it is possible to add a heartbeat table which records a timestamp at each stage; EXTRACT, DATAPUMP and REPLICAT. To do this, use the ADD HEARTBEATABLE command against the source and target databases (in each PDB). If you are performing ACTIVE/ACTIVE replication, ensure the heartbeat table is in a different schema to the GoldenGate EXTRACT and REPLICAT users as you will need to exclude those schemas from the replication.

From the heartbeat information we can determine how long each step takes and therefore where time is being lost. This is achieved by querying the associated tables and views.

```
GGSCI > add heartbeatable
2017-04-09 02:58:13 INFO    OGG-14001 Successfully created
heartbeat seed table ["GG_HEARTBEAT_SEED"].
2017-04-09 02:58:14 INFO    OGG-14032 Successfully added
supplemental logging for heartbeat seed table ["GG_HEARTBEAT_
SEED"].
2017-04-09 02:58:14 INFO    OGG-14000 Successfully created
heartbeat table ["GG_HEARTBEAT"].
2017-04-09 02:58:14 INFO    OGG-14033 Successfully added
supplemental logging for heartbeat table ["GG_HEARTBEAT"].
2017-04-09 02:58:14 INFO    OGG-14016 Successfully created
heartbeat history table ["GG_HEARTBEAT_HISTORY"].
2017-04-09 02:58:14 INFO    OGG-14023 Successfully created
heartbeat lag view ["GG_LAG"].
2017-04-09 02:58:14 INFO    OGG-14024 Successfully created
heartbeat lag history view ["GG_LAG_HISTORY"].
2017-04-09 02:58:14 INFO    OGG-14003 Successfully populated
heartbeat seed table with [CDB1].
2017-04-09 02:58:14 INFO    OGG-14004 Successfully created
procedure ["GG_UPDATE_HB_TAB"] to update the heartbeat tables.
2017-04-09 02:58:15 INFO    OGG-14017 Successfully created
procedure ["GG_PURGE_HB_TAB"] to purge the heartbeat history
table.
2017-04-09 02:58:15 INFO    OGG-14005 Successfully created
scheduler job ["GG_UPDATE_HEARTBEATS"] to update the heartbeat
tables.
2017-04-09 02:58:15 INFO    OGG-14018 Successfully created
scheduler job ["GG_PURGE_HEARTBEATS"] to purge the heartbeat
history table.

GGSCI > info heartbeatable
HEARTBEAT table goldengate.gg_heartbeat exists.
HEARTBEAT table goldengate.gg_heartbeat_SEED exists.
HEARTBEAT table goldengate.gg_heartbeat_HISTORY exists.
Frequency interval: 60 seconds.
Purge frequency interval: 1 days.
Retention time: 30 days.

SQL> select * from gg_lag;
LOCAL CURRENT_LOCAL_TS          REMOT INCOMING_HEARTBEAT_AGE
INCOMING_PATH           INCOMING_LAG ...
-----
CDB1 10-APR-17 11.45.14.997435 PM CDB1          56.868911
E_HR ==> P_HR ==> R_HR        4.375615 ...
```

The GG\_LAG (and GG\_LAG\_HISTORY) view does not show any detail about which step was lagging. For the all-important details we need to query the underlying table GG\_HEARTBEAT\_HISTORY, showing the lag in seconds between each timestamp:

```

select to_char(INCOMING_HEARTBEAT_TS,'DD-MON-YY HH24:MI:SS') HB_Time,
       INCOMING_EXTRACT extract,
       extract( day      from INCOMING_EXTRACT_TS      - INCOMING_HEARTBEAT_TS ) *24*60*60
     +extract( hour     from INCOMING_EXTRACT_TS      - INCOMING_HEARTBEAT_TS ) *60*60
     +extract( minute   from INCOMING_EXTRACT_TS      - INCOMING_HEARTBEAT_TS ) *60
     +extract( second   from INCOMING_EXTRACT_TS      - INCOMING_HEARTBEAT_TS ) e_lag,
       INCOMING_ROUTING_PATH datapump,
       extract( day      from INCOMING_ROUTING_TS      - INCOMING_EXTRACT_TS ) *24*60*60
     +extract( hour     from INCOMING_ROUTING_TS      - INCOMING_EXTRACT_TS ) *60*60
     +extract( minute   from INCOMING_ROUTING_TS      - INCOMING_EXTRACT_TS ) *60
     +extract( second   from INCOMING_ROUTING_TS      - INCOMING_EXTRACT_TS ) p_lag,
       INCOMING_REPLICAT replicat,
       extract( day      from INCOMING_REPLICAT_TS      - INCOMING_ROUTING_TS ) *24*60*60
     +extract( hour     from INCOMING_REPLICAT_TS      - INCOMING_ROUTING_TS ) *60*60
     +extract( minute   from INCOMING_REPLICAT_TS      - INCOMING_ROUTING_TS ) *60
     +extract( second   from INCOMING_REPLICAT_TS      - INCOMING_ROUTING_TS ) r_lag,
       extract( day      from HEARTBEAT_RECEIVED_TS    - INCOMING_HEARTBEAT_TS ) *24*60*60
     +extract( hour     from HEARTBEAT_RECEIVED_TS    - INCOMING_HEARTBEAT_TS ) *60*60
     +extract( minute   from HEARTBEAT_RECEIVED_TS    - INCOMING_HEARTBEAT_TS ) *60
     +extract( second   from HEARTBEAT_RECEIVED_TS    - INCOMING_HEARTBEAT_TS ) tot_lag
  from GG_HEARTBEAT_HISTORY
 order by INCOMING_HEARTBEAT_TS DESC;

```

HB_TIME	EXTRACT	E_LAG	DATAPUMP	P_LAG	REPLICAT	R_LAG	TOT_LAG
10-APR-17 12:09:18	E_HR	1.75	P_HR	1.07	R_HR	2.42	9.49
10-APR-17 12:08:18	E_HR	0.51	P_HR	1.95	R_HR	2.51	7.07
10-APR-17 12:07:17	E_HR	1.18	P_HR	1.81	R_HR	10.78	16.58
10-APR-17 12:06:18	E_HR	0.91	P_HR	<b>56.12</b>	R_HR	16.81	76.65
10-APR-17 12:05:18	E_HR	0.47	P_HR	<b>116.29</b>	R_HR	16.95	136.51
10-APR-17 12:04:17	E_HR	1.23	P_HR	1.09	R_HR	2.42	6.88
10-APR-17 12:03:17	E_HR	1.02	P_HR	1.05	R_HR	2.56	6.87
10-APR-17 12:02:17	E_HR	1.59	P_HR	1.99	R_HR	2.78	8.96
10-APR-17 12:01:17	E_HR	0.83	P_HR	1.85	R_HR	2.99	8.18
10-APR-17 12:00:15	E_HR	1.30	P_HR	1.59	R_HR	3.28	16.30

From this example, we can see that there was a temporary problem with the datapump (it was stopped for around 2 minutes for this test).

## Resolving Lag Issues

Lag (or performance) resolution is problem specific, but I have included a few pointers to help resolve common issues:

If the lag is in the EXTRACT and the extract group is CPU bound, it may be possible to either split the EXTRACT into multiple extracts or increase parallelism (2 by default) if using Oracle Enterprise Edition (Standard Edition is restricted to Parallelism 1).

If the REPLICAT is CPU-bound, it could either be parallelised (if it is an Integrated Replicat) or split into multiple co-ordinated replicats (using THREADRANGE). You may also want to look at the database for locking problems and to perform traditional SQL Performance Tuning (e.g. for any transformation look-ups you may be doing).

Datapumps should not perform any data manipulations or transformations if possible. This allows the use of the PASSTHRU parameter which can reduce CPU requirements by 30% and can be switched on for all tables which are not manipulated. It is possible to trade CPU for Bandwidth by compressing datapump TCP packets for transmission. In a high latency WAN environment it may be useful to identify any TCP size enhancements; reference MOS article 1071892.1 for help with setting TCPBUFSIZE and TCPFLUSHBYTES.

If you are using Integrated EXTRACTs or REPLICATs, review the Streams Pool in the SGA, and look at the Streams Pool Advisor to ensure this is configured optimally. You can use UTL\_SPDAV to analyse the LogMiner server processes for contention. Integrated EXTRACTs and REPLICATs are faster than the traditional options, can cause less contention, and should be used whenever possible.

Excessive waits may show up in AWR reports as “LogMiner preparer: Memory” and “LogMiner reader: buffer” and might be

improved with a larger MAX\_SGA\_SIZE in the TRANSLOGOPTIONS.

### TESTMAPPINGSPEED

You may need to prove if a lag issue for an EXTRACT or REPLICAT is caused by the complexity of the GoldenGate table mappings, especially where you are performing a lot of transformation or enhancing the data being replicated. We can use the TESTMAPPINGSPEED parameter, which will switch off key aspects of the system.

For an EXTRACT, it will prevent writing to TRAIL files to eliminate the disk performance of the TRAIL write from overall timing.

For a REPLICAT, it will prevent writing into the database, eliminating the database from the overall timing.

**WARNING: Do not do this in Production as you will prevent the replication of data and corrupt database synchronisation!**

### Add Throughput Reporting to all Processes

We can determine how many records each transaction has processed using the “stats” command in ggscli, but whilst that can be useful to see the current processing throughput it can be even more useful if you have some context for the data. We can build up a picture of typical throughput in the system which can indicate if there is a correlation between performance/ lag and transactional volume. A good way to do this is to have a set of standard reporting options enabled which will record information in the report file.

SUMMER 17

## Technology: Neil Chandler

### TIP: Using INCLUDE Functionality

When creating GoldenGate parameter files, you should use the "include" functionality to keep the parameter files tidy and readable, whilst allowing easy global change of common functionality.

```
-- Add standard reporting options for every
extract and replicat
include  /u01/app/goldengate/dirprm/i_
report.prm
```

### \$GG\_HOME/dirprm/i\_report.prm

```
-- configure reporting to provide throughput stats
REPORT AT 23:59                                -- provide a report on the
throughput for the day at 23:59
REPORTROLLOVER AT 00:01 ON MONDAY -- rollover the .rpt file
every week to keep them manageable
REPORTCOUNT EVERY 1 MINUTES, RATE -- write a throughput
report every n minutes
REPORTCOUNT EVERY 1000 RECORDS, RATE -- write a throughput
report every n records
```

### Example of throughput recorded in the process .rpt file

Rate = number of records processed since (startup / total time since startup)  
Delta = number of records processed since (last report / time since last report)

```
1000 records processed as of 2017-04-08 08:13:58 (rate 0,delta 0)
2000 records processed as of 2017-04-08 08:13:58 (rate 22524,delta 11262)
3000 records processed as of 2017-04-08 08:13:58 (rate 31529,delta 157282)
4000 records processed as of 2017-04-08 08:13:58 (rate 11082,delta 3762)
5000 records processed as of 2017-04-08 08:13:58 (rate 7156,delta 2960)
6000 records processed as of 2017-04-08 08:13:58 (rate 8587,delta 0)
7000 records processed as of 2017-04-08 08:13:59 (rate 7080,delta 3449)
8000 records processed as of 2017-04-08 08:13:59 (rate 5562,delta 2224)
9000 records processed as of 2017-04-08 08:13:59 (rate 5020,delta 2819)
10000 records processed as of 2017-04-08 08:14:00 (rate 4752,delta 3211)
11000 records processed as of 2017-04-08 08:14:00 (rate 4676,delta 4027)
12000 records processed as of 2017-04-08 08:14:00 (rate 5101,delta 0)
13000 records processed as of 2017-04-08 08:14:00 (rate 4880,delta 3209)
2017-04-08 08:14:09 INFO OGG-02232 Switching to next trail file /u01/app/goldengate/dirdat/AA000000013 at 2017-04-08
08:14:09.720249 due to EOF. with current RBA 19,999,662.
14000 records processed as of 2017-04-08 08:14:00 (rate 4716,delta 3282)
15000 records processed as of 2017-04-08 08:14:01 (rate 4619,delta 3590)
16000 records processed as of 2017-04-08 08:14:01 (rate 4571,delta 3956)
```

### Conclusion

I have only touched upon the start of your Troubleshooting journey. Make sure you are gathering enough data to identify where the problem is; once you have identified and understood the problem, resolving it may be the easy part. ■



### ABOUT THE AUTHOR

**Neil Chandler**  
Data Architect, Chandler Systems

Neil has been working in IT since 1988, focused primarily within Oracle, SQL Server and their related Server technologies: UNIX, Linux, Windows and SAN. He has been a successful technical lead for FTSE 100 Companies with Development and Production Systems experience gained in the Financial, Real-Time Logistics, Property and Accountancy sectors. Neil is also an Oracle ACE, Chairman of the UKOUG RAC, Cloud Infrastructure and Availability SIG, Tech17 Conference Lead and is a regular presenter at Oracle conferences around the world.

Blog: <https://chandlerdba.com>  
[www.linkedin.com/in/nchandler](http://www.linkedin.com/in/nchandler)  
 @ChandlerDBA

# UKOUG Strategy Project 2017

As highlighted in our Winter 2016 Oracle Scene, our Strategy project is important to UKOUG. It is our annual review of products and services where we take the opportunity to consider what our members want us to focus on for the coming year.

**Facilitated by myself as UKOUG Member Advocate Chair, supported by Karen McCormack, Head of Operations and Events, we work with a volunteer project team ensuring that we have representation from all our communities. We consider a number of inputs from our elected SIG committees plus post event feedback from all our events and conferences. In 2016, we also had external input from Karen Jones' (management consultant) report to the Board and considered our Sales Strategy for the first time recognising the importance of all our stakeholders.**

Over the last 3 years our UKOUG Strategy has focused on how we can improve the relevance and quality of our existing products and services whilst continuing to innovate e.g. 2016 saw us introduce our Journey to the Cloud event for Oracle Applications customers from all our communities to understand more about how to make a success of their move to Cloud Applications.

To support our focus on relevance and quality, and to better enable our volunteers and UKOUG team we introduced project processes in 2014. Each year since we have continued to improve these process such that in 2016 we delivered high quality content and well attended events across all our communities - with the team being able to focus their efforts to best support those communities that needed it most.

**And now to Strategy 2017.** It was felt that this year would be a step change from previous years. We had done a significant amount of "tidying" of our business. We needed to review our products and services in a broader way and focus on the key elements that are going to impact UKOUG's success in the coming years.

We kicked off with a one day workshop attended by members of the Strategy project team. We considered some key items which the team felt important to look at in our future including - how we align with Oracle, Oracle product vs. functional content, our membership model and the role of user groups in the Cloud. We worked in groups brainstorming and sharing thinking and came away from the day with lots of great ideas to be factored into our 2017 Strategy.



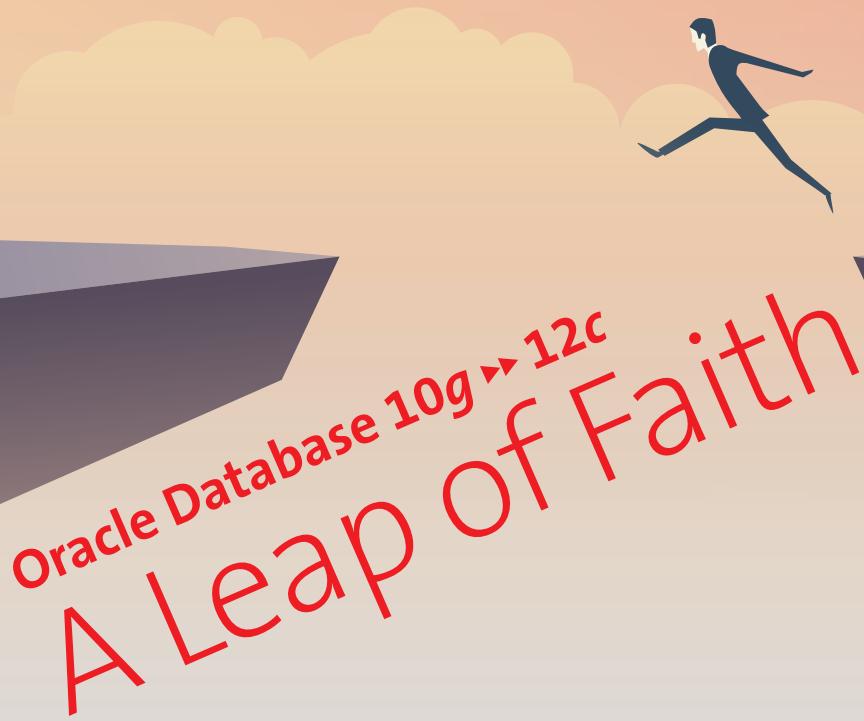
Fiona Martin  
UKOUG Director  
[fiona.martin@ukoug.org.uk](mailto:fiona.martin@ukoug.org.uk)

We also realised that it was time to take a broader look at the market in which we operate. Oracle has changed significantly over the last 10 years with a large number of acquisitions, a number of which have been successfully absorbed into UKOUG. But we need to remember, Cloud and Digital are not just industry buzzwords but significant disruptive influencers in our market.

Fast forward to April 2017 - we have finalised our 2017 Strategy Project output. The great news is it confirms the need for us to continue to do all the things we have been doing over the previous three or four years to deliver quality content and networking opportunities for our members. So you will see all our SIGs, Events and Conferences continue to evolve and improve as we work with our volunteers throughout the year. There are also a number of recommendations for new initiatives such as UKOUG meetups allowing members to organise their own get-togethers extending our offering and reaching new members.

Our strategy work does highlight the need for us to focus on growing our membership. To do this we plan to embark of two significant pieces of work in 2017. The first is to look at our UKOUG mission, led by Member Advocate Chair Debra Lilley, and will be a review of our mission and how it translates into what we deliver. We need to consider our voice in the Oracle market and how we ensure we have a differentiated offering which is valued by our members and allows us to reach new Oracle customers. We also need a project to focus on membership – this will be sponsored by UKOUG President, Paul Fitton. It will focus on protecting our existing members whilst growing to reach new Oracle customers, all supported by a membership model review that meets everyone's needs.

One thing is for sure 2017 is going to be a great year for UKOUG. I recommend you read the full Strategy project output and then get involved. UKOUG is a membership organisation – with our members defining and shaping what we deliver. We are all privileged to be living through a period of change in our day jobs and in the Oracle market – meaning it's an exciting time and offers UKOUG and our members a great opportunity. ■



Anand Elangovan, Associate Director, Mindtree

**The Customer: BrightHouse** – The UK's leading rent-to-own company with more than 300 stores across the country. In their own words – “A well-run and carefully managed company where everyone, from the shop floor to the boardroom, takes great pride in providing top quality products and outstanding service to more than 275,000 hard-working customers.”

<https://www.brighthousegroup.co.uk/our-story/brighthouse-today/>

**The Problem Statement** – It is autumn of 2015 and the sales peak is fast approaching! The current database version – Oracle 10gR2 [10.2.0.4] is increasingly groaning under the burgeoning business transactional volume. Four of the multi-million row transactional tables of the OLTP Database are already Range-Partitioned, but database performance is nowhere near satisfactory. Myriad problems keep cropping up every day keeping the Application Support team on the edge. They are under immense pressure from management, internal IT and end-users to fix the problem. Oracle consultants are beckoned to take stock of the issue at hand. One look, and they say – “Ahem, we are sorry, but we cannot help your situation. Oracle 10g is already EOL. ‘Premier Support’ ended in July 2010 and ‘Extended Support’ ended in July 2013, and guess what, Oracle 11g is also almost EOL! No way but to leap-frog to Oracle 12c!”

**The Action Plan** – With about 50 large OLTP databases across production, test and development environments, the task looks daunting. First things first, a Project Board with 4 senior IT members is instated. The Board in turn gets the necessary approvals and budget allocated for the project. Then a project team to execute the Oracle upgrade project is quickly put in place. At this juncture, a point is raised that since the existing App Support team does not have prior experience of doing an Oracle 12c upgrade, it wouldn't be a bad idea to partner with an external consultant who has the expertise and know-how of how these things are done. Although Oracle Corp. consultants might be available for support on standby, we need someone who can hand-hold the team at the granular level on a day-to-day basis.

Mindtree Ltd has been a strategic technology partner to BrightHouse for a few years now. Mindtree develops and maintains multiple application stacks across various technologies, including BrightHouse's flagship OLTP application.

An Oracle consultant is requisitioned from Mindtree for the project and Mindtree comes up with an expert who has been part of many Oracle upgrade projects with multiple customers.

A project team is put together with following skills:

Skill	BrightHouse	Mindtree
DBA Team	1	1
Linux System Admin	1	
Test / Project Manager		1
Project Manager	2	

Then a project plan is drawn up with the following stages spread over 7 months (28 Weeks).

Stage	Details	Duration (Weeks)
1	Project Initiation	6
2	Planning & Testing	16
3	Proof of Concept	3
4	Delivery	1
5	Handover to BAU	1
6	Project Closure	1

**Stage 1:** The usual flurry of activities which happen at the initiation of any new IT project. Everyone is excited and nervous at the same time and all have great hopes – “The proverbial pot o’ gold at the end of the rainbow”. Now with the resources secured, business cases approved and budget secured, we move on to Stage 2.

**Stage 2:** In my opinion, the most important stage of all. As a popular quote from Albert Einstein goes - “If I had an hour to solve a problem, I'd spend 55 minutes thinking about the problem and 5 minutes thinking about solutions.” After hours on end brainstorming about the actual approach to be taken, we finally arrive at a consensus. We'll have two approaches, one for all non-production environments, typically standalone databases and another for the production plus 2 other environments which are on a 3-Node / 2-Node RAC. We prepare the plan based on multiple MoS Notes and Oracle documentation. At this stage, we also delve into previous 12c upgrade experiences done by Mindtree and come up with a list of known problems/issues which might

potentially crop up during the actual production upgrade (eg:- Bug 21459392, Oracle error ORA-28040, ORA-00406, and the likes). We tweak our plans accordingly. The core activities in this stage include the following:

- Upgrade the offshore development environment
- Point the core OLTP application on to the new 12c dev database and run Auto and Manual regression cycles
- Fix the defects which crop up due to incompatible features (Remember, it's Oracle 10g – A 15 year old legacy version!) and run through the regression test cycles iteratively
- Test the downstream applications  
Note: - On 10g, Oracle CDC was being used to replicate data onto an IBM iSeries (erstwhile AS/400) Server which is being used as a reporting platform. However since Oracle CDC has been rendered redundant on Oracle 12c, CDC has been replaced by IBM IDR (InfoSphere Data Replication).
- Upgrade a few test environments onsite and run the curated OLTP application on these to ensure we are not running into any new problems caused by running the application on a 12c database
- Prepare a plan for the OEM upgrade to OEM 12c. Although the recommended version would be 13c, since our OS is still on OL 5.4, we cannot possibly migrate to OEM 13c as yet
- Tweak the plans with the learnings from the actual development and test environment upgrades

**Stage 3:** Now, it is time to simulate the production upgrade on a similar RAC environment. The high level plan is as follows:

- Assign a 2-Node RAC environment (RAC-1) as the source database and another as the target database (RAC-2)
- Tidy up all Oracle 10g components from RAC-1 and do a fresh install of Oracle 12c homes (Grid, ASM & DB)
- Drop the existing 10g database on RAC-2 and restore a one day old backup on the same and recover it to a point-in-time (as close to the current time as possible)
- Pre-create the tablespaces on the 12c database. (Script sourced from RAC-2)
- Import the 10g data (minus indexes & constraints) on RAC-1 into the 12c database on RAC-2 using a network link. (impdp ... network\_link=<db\_link>)
- Once data is secured, import the indexes and constraints separately using a different parameter file
- Compile all database objects
- Verify the Grid infrastructure (cluvfy), ASM (asmcmd) and other components of the environment
- Test the instance failover/switchover between the 2 nodes
- Everything goes through smoothly. The stage is set!

The overall strategy looks as below:

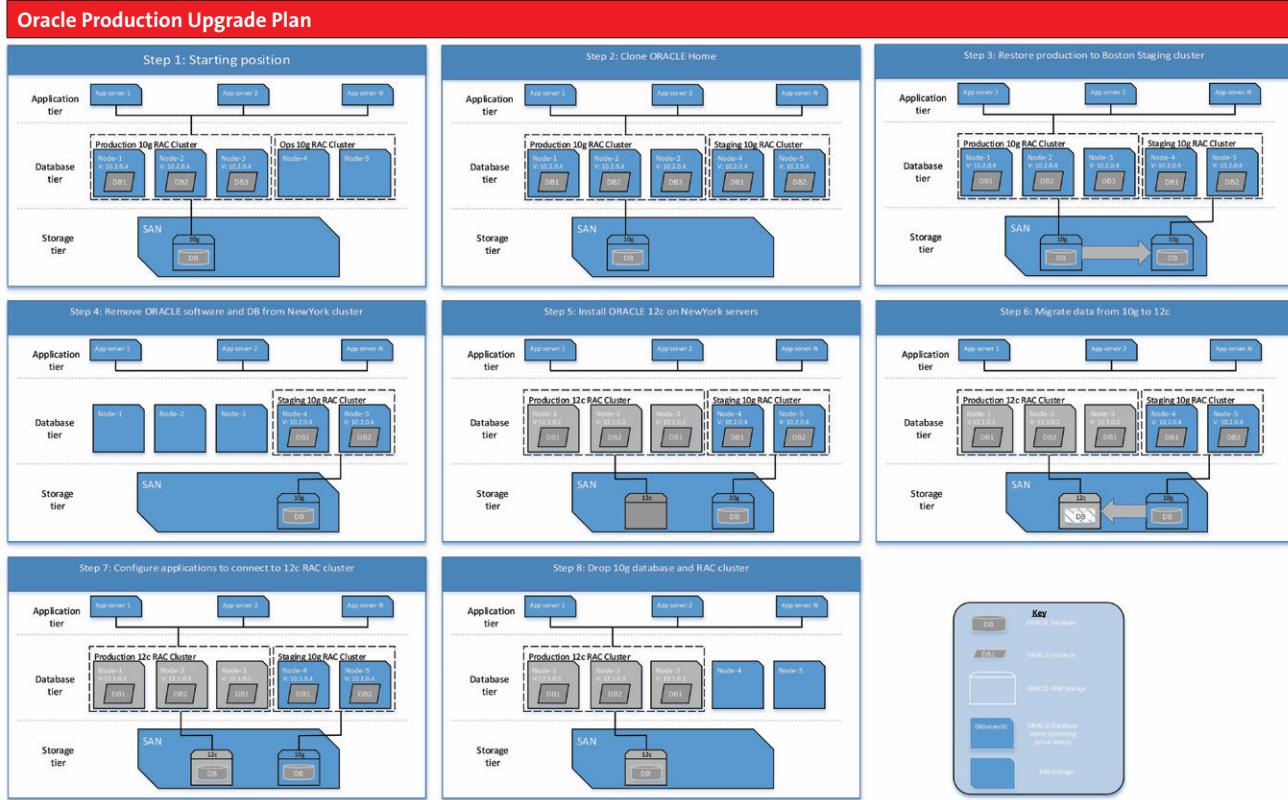
## Non-Production Environments

	Dev & Test Env @offshore	Test Env @onshore	2 other RAC env @onshore
Methodology	In-place upgrade	Out-of-place upgrade	
Upgrade Path	a) 10.2.0.4 to 10.2.0.5 (MoS Note – 559304.1) b) 10.2.0.5 to 12.1.0.2 using DBUA	a) Tidy-up existing Oracle 10g binaries & data. b) Fresh install 12c Grid, ASM & DB homes. c) Import data using IMPDP	

SUMMER 17

# Technology: Anand Elangovan

## Production Environments



**Stage 4:** The D-Day finally arrived and we had already prepared the staging 10g cluster over the previous week with respect to the Clusterware, ASM & DB homes. Now the staging server is an exact replica of the production 10g cluster. We had planned the production upgrade over a weekend.

It's 08:00 on Saturday and first things first, we restore the latest production backup on to the staging 10g database. Saturdays, being the busiest day for the business, we need to wait till close of business at 18:00 at which time we sever all application connections including downstream replication servers to the production database and roll-forward the staging database using the archive logs generated from 08:00 onwards on the production server till the last log to ensure zero data loss. (Steps 1 to 3 complete). Then we set the ball rolling:

**Step 4** in above diagram – Completely clean up all 10g homes, including data, from the production cluster. A few major hiccups are encountered. Some 10g binaries and other associated files cannot be removed cleanly and the de-installer utility freezes. Very sticky! We use one of the MoS notes to help out in this area and are finally successful. This was not anticipated earlier. Precious hours are lost!

**Step 5:** Install 12c binaries – Clusterware, ASM & DB homes. This step goes smoothly. At the end of this step, we pre-create the roles and tablespaces required for the data import.

**Step 6:** Import the data from the staging server into the new 12c production database over a network link - This activity was supposed to start midnight, Saturday, but it is about 05:00 on Sunday morning, when we actually do this. The time lost in Step 4 has snowballed into this delay.

Finally, we kick off the data import minus the indexes and constraints. This finishes at 08:00. Immediately we kick off the indexes and constraints import, which we had estimated to take about 8 hours, considering the data volume. However, all of us are very nervous at this point as the management had given us a hard-stop at 12:00 on Sunday, by which time we had to get both the data and indexes into the 12c database. If we fail to get this done, then the rollback plan is supposed to be deployed which would take approximately 8 to 10 hrs. We cannot afford to lose a trading day on Monday due to a failed upgrade!

The rollback plan was to remove all 12c binaries from the production server, install 10g again and restore the backup from the NFS location and roll forward the database to the cut-off time of the previous evening using the archive logs.

But, by 12:00, only about 40% of the indexes are imported and tension is showing on all our foreheads! What do we do? Do we abort and start the rollback process or do we continue, which will entail a risk that if we run into any more problems later, we might not have enough time to perform a rollback.

A meeting of all the management stakeholders is hurriedly called and after we (the team who are actually doing the upgrade) give them the confidence that the upgrade will go through successfully since the data is already in and it's just a matter of indexes and constraints, the decision is finally taken to move on. Now there's no turning back. This is why I have named this article a 'Leap-of-Faith'! Truly it is!

Finally, the import finishes at about 18:00 and we use up the remainder of the day to do all the post-upgrade activities, tying up loose ends and cleaning and mopping up stuff. The applications are then pointed to the spanking new 12c database. A UAT is done and everyone is happy that all is working well.

A nail-biting finish to an exhilarating roller-coaster of a ride! As the clichéd adage goes – All is well that ends well!

However, we had a few performance problems immediately after the upgrade, which I'll briefly touch upon:

- 1) Dynamic Statistics and adaptive query optimization (init parameter OPTIMIZER\_DYNAMIC\_SAMPLING and OPTIMIZER\_ADAPTIVE\_FEATURES) is enabled by default on a new 12c installation. We had to disable this forcibly, so as to bring down the CPU usage of the RAC to acceptable levels (<30%). We plan to enable it on a future date after adequate testing and customising it to our exact requirement.
- 2) Some legacy SQL queries had to be rewritten as it was performing abysmally slow post the upgrade. More often than not, we tend to keep upgrading the Oracle versions in the hope that the performance of the database will be boosted exponentially on its own. However, personally, I feel that we should constantly relook at old SQL queries / functions / procedures and try to rewrite and leverage the many features

introduced in each new Oracle database version. Yes, I know it costs more, but it's worth the trouble and money. This will enable you to truly savour the fruits of the upgrade.

- 3) As usual, we encountered some ORA-600 errors in the weeks after the upgrade, but nothing too troublesome. MOS advised to patch the DB to the latest version which will make the ORA-600 go away, but you and I know, old ones go away, but new ones keep cropping up! It's a way of life with Oracle and I guess it's part and parcel of product development.

Some learnings and key points which I think made this project a huge success:

**Planning sufficient test cycles** – In our case, the weeks and months we spent testing and re-testing the actual upgrade and applications stood us in good stead during the actual upgrade process.

**Rollback plan** – It's extremely important to have a rollback plan in place. Although 99% of the upgrades go through successfully, it's mandatory insurance.

**Strategic partnership** – It was a shining example of the great things that are possible with the right strategic partnership. The combined technical expertise and years of prior experience helped the team to stand grounded in the face of extreme adversity and the successful completion of the upgrade just proved that the initial decision to partner with Mindtree was worth the effort and money.

The cherry on the cake? Well, we finished the project 2 months ahead of schedule, (Yes, 2 months!) leading to cost savings and a shorter TTM, which is a rare phenomenon in today's IT project lifecycle! ■



**Anand Elangovan**

Associate Director, Oracle Practice, Mindtree

Anand Elangovan is an Oracle SME & DBA in Mindtree's Oracle Practice. He has over 16 years of industry experience in varied roles such as Oracle Database Architecting, solution and administration. He has led and managed multiple Oracle upgrades, migrations and administration activities for customers across industry verticals such as BFSI, Retail, Automotive and Aeronautical domains in US, Europe & Middle-East geographies.



[www.linkedin.com/in/anand-elangovan-8855618](http://www.linkedin.com/in/anand-elangovan-8855618)

# APPS<sup>17</sup> JDE<sup>17</sup> TECH<sup>17</sup>

► UKOUG Applications Conference & Exhibition

► UKOUG JD Edwards Conference & Exhibition

► UKOUG Technology Conference & Exhibition

4-6 DEC 2017

#ukoug\_apps17

5-6 DEC 2017

#ukoug\_jde17

4-6 DEC 2017

#ukoug\_tech17

**UKOUG's Apps17, JDE17 & Tech17 will see over 1,800 attendees from across the UK and around the globe gather for three days of education, knowledge sharing and networking.**

UKOUG's co-located conferences offer the ideal platform to place yourself as an industry leader and share your expertise with Oracle Technology & Applications users.

## How do you take part?

We're looking for speakers who are peers, practitioners, strategists and proven business leaders to deliver educationally focused presentations, roundtable discussions or hand-on labs that would appeal to either all experience levels or those of: beginner, intermediate or expert/advanced - so whether you've a high level practical session or a beginner's guide to..., we'll have an audience keen to listen.

## Want to present? Fantastic! Here's what you need to do:

Register as a speaker to your chosen conference. You will then be given access to the Speaker Lounge – this is where you enter your 200-word abstract giving an overview of your presentation, along with this you will be asked about session length, delivery format and topic area. You can submit as many abstracts as you like, and you can edit them up until 17:00 (BST), 26th June 2017.





## UKOUG Applications Conference & Exhibition 2017

### What we're looking for/What to expect

Apps17 will see current and future users alongside those supplying Oracle products and services come together for this key industry event to discover more about: Oracle's E-Business Suite, Customer Experience, Business Analytics, Business & Strategy, PeopleSoft and Cloud Applications. The three-day agenda will offer content on both functional, on-premise and cloud topics.

Take a look at the topics and subjects areas below to see what Apps17 will offer and where you can share your knowledge.

#### Applications Technology

*This is a new submissions area for the Apps conference. Cutting across the major Oracle functional areas like E-Business Suite and Fusion Apps, we are looking for content around the technologies required to build, operate and maintain them*

- ▶ Traditional Apps DBA & DBAAS
- ▶ Advanced Middleware (On-premise, MCS, BOT Agents)
- ▶ Platform service/PaaS
- ▶ Fusion SaaS Integration (Traditional and PaaS/SaaS)
- ▶ Traditional Apps Middleware ( Forms, Reports, Discoverer, OBIEE, ODI, SOA ) + Matching Cloud services (JCS, BICS, DVCS, PCS, ICS)
- ▶ Infrastructure Options ( On-Premise, Hybrid, IAAS, and secure deployment options technology available - AWS, Azure, OraCloud, private clouds to be covered)
- ▶ Fusion Deployment Models
- ▶ Realistic SaaS customisation technologies and options
- ▶ Oracle Apps Tech Roadmap/Fusion Roadmap/ Apps Unlimited

#### Business Analytics

*Business Analytics at both Apps17 & Tech17*

- ▶ Big Data & Data Warehousing
- ▶ Data Visualisation & Presentation
- ▶ Enterprise Performance Management (EPM)
- ▶ Data & Integration & Provisioning
- ▶ Predictive Analytics & Machine Learning
- ▶ Business Intelligence Applications

#### Business & Strategy

- ▶ Business Process Management (BPM)
- ▶ Business Support and Growth
- ▶ Change Management
- ▶ Enterprise Information Strategy
- ▶ Platform Evolution
- ▶ Supplier Management
- ▶ Implementation and Upgrade Project
- ▶ General
- ▶ Change Management & Transformation
- ▶ Oracle Partner Solutions & 3rd Parties
- ▶ IT Strategy, Planning, Management and Governance

#### Cloud Financials

- ▶ Managing Integrations between Cloud Financials and legacy systems
- ▶ PaaS Solutions
- ▶ Customer Success Stories
- ▶ Co-Existence of Oracle on-premise and Cloud modules
- ▶ Reporting from Oracle Cloud for on-premise data
- ▶ Reporting from Oracle Cloud for on-premise data
- ▶ Data Migrations best practices when moving to Cloud
- ▶ Specialist Cloud modules - PBCS, TRCS etc.
- ▶ Maximising Mobile Apps
- ▶ Management of Cloud release upgrades & Support

#### Cloud HCM

- ▶ Administration (Global HR, Payroll; Compensation Modelling; Advanced Benefits; Time & Labour)
- ▶ Talent Management (Performance Management, Talent Acquisition, Learning)
- ▶ Business Strategy (Business, Case Studies)
- ▶ Co-Existence (Middleware, Integrators)
- ▶ Analytics and Reporting (HR Analytics)
- ▶ Service Delivery (Self Service, helpdesk)
- ▶ Mobile (Self Service, Reporting Analytics, Mobile Apps)
- ▶ Integration (Middleware, PAAS, IAAS, SAAS)
- ▶ Project Management (Methodology)

#### Oracle E-Business Suite Financials

- ▶ GL & Reporting (General Ledger, Financials Accounting Hub, Hyperion Financial Management, (GRC) Governance, Risk, and Compliance Management, and Financial Analytics)
- ▶ Invoice to Cash (Receivables, iReceivables, Advanced Collections, Treasury & Cash Management Plus Supply Chain Analysis)
- ▶ Procure to Pay (Purchasing, Sourcing, iProcurement, iSupplier Portal, & Payables including Invoice Automation Plus Procurement & Spend Analysis)
- ▶ Projects & Expenses (Project Costing, Billing, Contracts, Planning & Control, Resource Management, Collaboration & iExpenses Plus Project Portfolio Analysis)

#### Oracle E-Business Suite HCM

- ▶ Administration (HR, Payroll; Compensation Modelling; Advanced Benefits; Time & Labour)
- ▶ Talent Management (Performance Management, Taleo, iRecruitment, HR, iLearning)
- ▶ Analytics and Reporting (OBIEE, Reporting, HR analytics)
- ▶ Project Management (Methodology)
- ▶ Service Delivery (Self Service)
- ▶ Mobile (SSHR, OBIEE, Reporting Analytics, Mobile Apps)
- ▶ Business Strategy (Business, Case Studies)
- ▶ Co-Existence (Middleware, Integrators)

#### Customer Experience

- ▶ Marketing
- ▶ Data Cloud
- ▶ Customer Experiences
- ▶ Configure Price Quote (CPQ)
- ▶ Sales Performance Management (SPM)

#### PeopleSoft

- ▶ Technical
- ▶ Strategy
- ▶ Functional - HCM/Global Payroll
- ▶ Functional - Finance

*Please note presentation length can be either: 25mins, 45mins or 1hr 30mins.*



UKOUG JD Edwards Conference &amp; Exhibition 2017

## What we're looking for/What to expect

JDE17 the UK's largest independent gathering of JD Edwards users and partners returns to the ICC this December. This two day event will offer content on a variety of legacy systems and latest release features, plus you can hear from the Oracle Executive Team with announcements direct from Oracle OpenWorld.

If you have something to share with this audience, do submit an abstract in one of the following areas:

- ▶ Business Function: Securing your data, usage of complementary tools & increasing your ROI
- ▶ Customer stories: Share your real world examples
- ▶ Business Process Change: Get ready for GDPR, performance improvement, adaptability
- ▶ Future: Cloud technologies, integration projects, strategic planning

*When writing your abstract please bear in mind that the presentation length should be 45mins including time for any Q&A.  
Find out more at: [www.jde17.ukoug.org](http://www.jde17.ukoug.org)*



UKOUG Technology Conference &amp; Exhibition 2017

## What we're looking for/What to expect

The UK's most anticipated Oracle Technology conference is back and will provide answers and insight on a variety of legacy tools and new product features. Our agenda will host around 250 sessions, across APEX, Business Analytics, Development, Database, Middleware and Oracle Systems, so if you've expertise in the following then do submit.

We're particularly looking for abstract submissions on the following topics and subjects:

### APEX

- ▶ APEX Development
- ▶ DB Design
- ▶ Development Practices
- ▶ Extending Core APEX
- ▶ Real World Examples

### Oracle Database

- ▶ 12c Database
- ▶ Compliance, Audit & Security
- ▶ HA/MA
- ▶ Infrastructure
- ▶ Integration
- ▶ Management & Administration
- ▶ Performance & Internals

### Business Analytics

*Business Analytics at both Apps17 & Tech17*

- ▶ Big Data & Data Warehousing
- ▶ Data Visualisation & Presentation
- ▶ Enterprise Performance Management (EPM)
- ▶ Data & Integration & Provisioning
- ▶ Predictive Analytics & Machine Learning
- ▶ Business Intelligence Applications

### Open Source Non-Oracle Complementary Technologies

- ▶ APEX
- ▶ Business Analytics
- ▶ Database
- ▶ Development
- ▶ Middleware
- ▶ Systems

### Development

- ▶ Development Practices
- ▶ Mobile
- ▶ Technology
- ▶ Tools
- ▶ Web

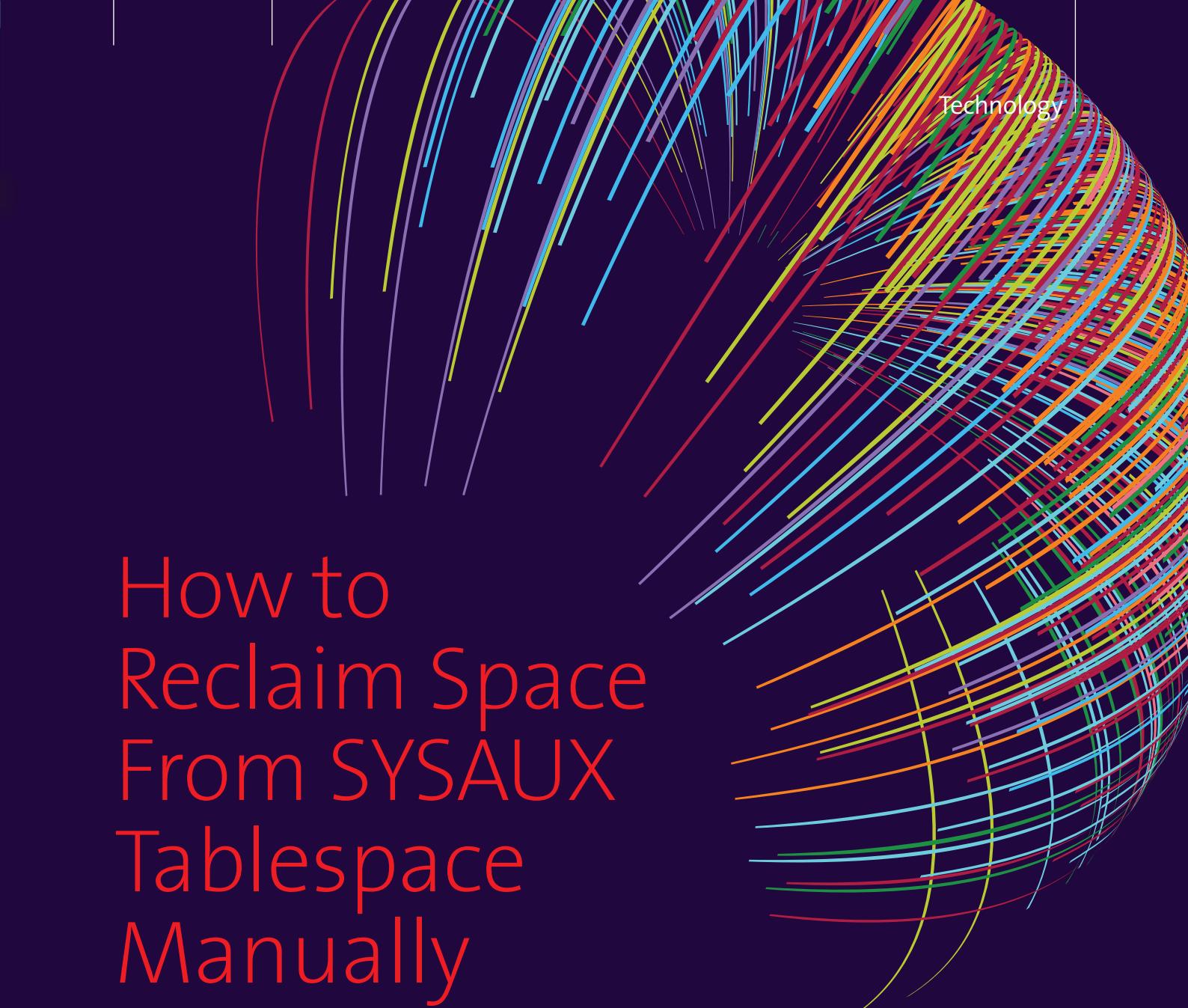
### Oracle Systems

- ▶ Cloud/IaaS
- ▶ Engineered Systems
- ▶ Hardware
- ▶ Operating Systems
- ▶ Virtualisation

### Middleware

- ▶ DevOps
- ▶ Integration
- ▶ Platform
- ▶ Security

*Whether you'd like to present a quick overview or a deep-dive masterclass, we offer a variety of presentation length options: 25mins, 50mins or 1hr 50mins. Find out more at [www.tech17.ukoug.org](http://www.tech17.ukoug.org)*



# How to Reclaim Space From SYSAUX Tablespace Manually

SYSAUX is a secondary tablespace for storage of a number of database components that were previously (before 10g database) stored in the SYSTEM tablespace. It is created as a locally managed tablespace using automatic segment space management.

Dhananjay Papde, Lead Architect & Technology Lead, SITA ♠

V.Samara Simha Reddy, Oracle EBS, Technical Specialist, Mindtree Ltd, India

The SYSAUX tablespace should have a minimum size of 250MB and needs to be PERMANENT with extent management local and ASSM (Automatic Segment Space Management). It cannot be made read only. Hence, proper care should be taken while creating the SYSAUX tablespace as the tablespace attributes are not modifiable once these are set.

Previously, many Oracle features required their own separate tablespaces (such as the RMAN recovery catalog, Ultra Search, Data Mining, XDP, and OLAP). This increases the management responsibility of the DBA. The SYSAUX tablespace consolidates these tablespaces into one location, which becomes the default tablespace for these Oracle features.

By default, when we create an Oracle database, the SYSAUX tablespace gets created. If we are using Oracle Managed

Files (OMF), the tablespace is created in the appropriate OMF directory. If we use the sysaux datafile clause in the CREATE DATABASE statement, the SYSAUX tablespace datafile(s) will be created in the location where we define it. Finally, if no sysaux datafile clause is included and OMF is not configured, Oracle creates the SYSAUX tablespace in a default location that is OS-specific.

In our EBS environment SYSAUX grew substantially and there was a need to purge the same. We have followed this approach on Oracle Database 11gR2.

We followed Oracle's recommended way:

- Execute below command to list available stats from the database, that have not been purged.

SUMMER 17

## Technology: Dhananjay Papde & V.Samara Simha Reddy

```
select dbms_stats.get_stats_history_availability from dual;
```

- Execute below command to purge stats older than 30 days.

```
EXEC BEGIN DBMS_STATS.PURGE_STATS(SYSDATE-30);
```

- If there are additional days of stats available, then it is best to do this in a staggered way like below:

```
EXEC BEGIN DBMS_STATS.PURGE_STATS(SYSDATE-30);
EXEC BEGIN DBMS_STATS.PURGE_STATS(SYSDATE-60);
EXEC BEGIN DBMS_STATS.PURGE_STATS(SYSDATE-90);
```

### Why does the SYSAUX tablespace grow much larger than expected?

There could be number of potential reasons:

1. Active Session History (ASH) data has grown too large
2. High Retention Period
3. Segment Advisor has grown too large
4. Increase in older version of Optimizer Statistics (SM/OPTSTAT)

### How do we identify the SYSAUX space usage?

There are basically two ways to identify that we are aware

1. Running @?/rdbms/admin/awrinfo.sql → Detailed Info like Schema breakdown, SYSAUX occupants space usage etc.
2. Below statement shows space used by OPTSTAT:

```
col Mb form 9,999,999
col SEGMENT_NAME form a40
col SEGMENT_TYPE form a6
set lines 120
select sum(bytes/1024/1024) Mb, segment_name,segment_type from
dba_segments
where tablespace_name = 'SYSAUX'
and segment_name like 'WRI$_OPTSTAT%'
and segment_type='TABLE'
group by segment_name,segment_type order by 1 asc
/
```

MB	SEGMENT_NAME	SEGMENT_TYPE
0	WRI\$_OPTSTAT_AUX_HISTORY	TABLE
0	WRI\$_OPTSTAT_OPR	TABLE
0	WRI\$_OPTSTAT_SYNOPSIS_HEAD\$	TABLE
0	WRI\$_OPTSTAT_SYNOPSIS\$	TABLE
0	WRI\$_OPTSTAT_SYNOPSIS_PARTGRP	TABLE
51	WRI\$_OPTSTAT_HISTGRM_HISTORY	TABLE
436	WRI\$_OPTSTAT_TAB_HISTORY	TABLE
640	WRI\$_OPTSTAT_IND_HISTORY	TABLE
52,540	WRI\$_OPTSTAT_HISTHEAD_HISTORY	TABLE

9 rows selected.

```
col Mb form 9,999,999
col SEGMENT_NAME form a40
col SEGMENT_TYPE form a6
set lines 120
select sum(bytes/1024/1024) Mb, segment_name,segment_type from
dba_segments where tablespace_name = 'SYSAUX'
group by segment_name,segment_type order by 1 asc
/
```

MB	SEGMENT_NAME	SEGMENT_TYPE
521	I_WRI\$_OPTSTAT_IND_OBJ#_ST	INDEX
24,586	I_WRI\$_OPTSTAT_HH_ST	INDEX
37,725	I_WRI\$_OPTSTAT_HH_OBJ_ICOL_ST	INDEX

In our case, OPTSTAT were occupying most of the space.

SM/AWR:- It refers to Automatic Workload Repository. Data in this section is retained for a certain amount of time (default 8 days). Setting can be checked through DBA\_HIST\_WR\_CONTROL.

SM/OPSTAT: - Stores older data of optimizer statistics. Setting can be checked through dbms\_stats.get\_stats\_history\_retention. This is not a part of AWR and is not controlled by AWR retention.

### Before Purging of SYSAUX Tablespace

	APPNS_TS_TX_DATA	APPNS_TS_SEED	APPNS_TS_TX_IDX	APPNS_TS_SUMMARY	USERS	SYSAUX	APPNS_TS_INTERFACE	APPNS_TS_MEDIA
APPNS_TS_TX_DATA	248820	203141.5	45678.5	81.64195				
APPNS_TS_SEED	5696	4673.25	1022.75	82.0444171				
APPNS_TS_TX_IDX	175488	145174.125	30313.875	82.7259556				
APPNS_TS_SUMMARY	67696	60955.625	6740.375	90.0431709 *				
USERS	20800	19257.5625	1542.4375	92.5844351 *				
SYSAUX	169760	161512.563	8247.4375	95.1417074 *				
APPNS_TS_INTERFACE	24235.25	23096.5	1138.75	95.3012657 *				
APPNS_TS_MEDIA	293312	290548.375	2763.625	99.0577866 *				

23 rows selected.

Followed steps listed below to reclaim the space. Also, sought advice from Oracle before executing below steps.

```
Select dbms_stats.get_stats_history_availability from dual;
```

- First create three backup tables which keeps last 30 days data from following statistics tables

```
create table SYS.BACKUP1 as (select * from SYS.WRI$_OPTSTAT_HISTHEAD_HISTORY where savetime > (SYSDATE - 30));
create table SYS.BACKUP2 as (select * from sys.WRI$_optstat_tab_history where savetime > (SYSDATE - 30));
create table SYS.BACKUP3 as (select * from sys.WRI$_optstat_ind_history where savetime > (SYSDATE - 30));
```

- Drop the related indexes on those tables

```
drop index I_WRI$_OPTSTAT_HH_OBJ_ICOL_ST;
drop index I_WRI$_OPTSTAT_HH_ST;
```

- Recreate the index

```
CREATE UNIQUE INDEX "SYS"."I_WRI$_OPTSTAT_HH_OBJ_ICOL_ST" ON
"SYS"."WRI$_OPTSTAT_HISTHEAD_HISTORY" ("OBJ#", "INTCOL#", "SYS_
EXTRACT_UTC("SAVETIME"), "COLNAME") PCTFREE 10 INITTRANS 2 MAXTRANS
25 COMPUTE STATISTICS STORAGE(INITIAL 65536 NEXT 1048576
MINEXTENTS 1 MAXEXTENTS 2147483645 PCTINCREASE 0 FREELISTS 1
FREELIST GROUPS 1 BUFFER_POOL DEFAULT) tablespace "SYSAUX";
CREATE INDEX "SYS"."I_WRI$_OPTSTAT_HH_ST" ON "SYS"."WRI$_
OPTSTAT_HISTHEAD_HISTORY" (SYS_EXTRACT_UTC("SAVETIME"))
PCTFREE 10 INITTRANS 2 MAXTRANS 255 COMPUTE STATISTICS
STORAGE(INITIAL 65536 NEXT 1048576 MINEXTENTS 1 MAXEXTENTS
2147483645 PCTINCREASE 0 FREELISTS 1 FREELIST GROUPS 1 BUFFER_
POOL DEFAULT) TABLESPACE "SYSAUX";
```

- Truncate the above tables to release the space

```
truncate table SYS.WRI$_OPTSTAT_HISTHEAD_HISTORY;
truncate table SYS.WRI$_OPTSTAT_TAB_HISTORY;
truncate table SYS.WRI$_OPTSTAT_IND_HISTORY;
```

- Insert last 30 days data in the mentioned three tables

```
insert into SYS.WRI$_OPTSTAT_HISTHEAD_HISTORY (SELECT * FROM SYS.
BACKUP1);
insert into SYS.WRI$_OPTSTAT_TAB_HISTORY (select * from SYS.
BACKUP2);
insert into SYS.WRI$_OPTSTAT_IND_HISTORY (select * from SYS.
BACKUP3);
commit;
```

- Drop the above three temporary backup tables

```
drop table SYS.BACKUP1;
drop table SYS.BACKUP2;
drop table SYS.BACKUP3;
```

- Make sure indexes are in usable state using the following statement:

```
select index_name from dba_indexes where status='UNUSABLE';
```

- Then purge the stats using following command:

```
exec dbms_stats.purge_stats(SYSDATE-30);
select dbms_stats.get_stats_history_availability from dual;
```

## After Purging of SYSAUX Tablespace

TABLESPACE_NAME	TOTAL	USED	FREE	PCT_P
OWAPUB	1000	.078125	999.921875	.0078125
OLAP	500	.0625	499.9375	.0125
APPS_TS_TOOLS	800	.125	799.875	.015625
PORTAL	800	.46875	799.53125	.05859375
CTXD	3192	92.609375	3099.39063	2.90129621
ODM	100	9.5625	90.4375	9.5625
APPS_TS_QUEUES	4024	619.5	3404.5	15.3951292
SYSAUX	169760	32037.875	137722.125	18.8724523
APPS_TS_ARCHIVE	4096	1711.25	2384.75	41.7785645

Note:- Please note above steps only release space within the tablespace. However, in order to reduce the datafile size, after purging below, the resize command can be used.

```
Ex:- alter tablespace datafile '+DATA/TEST/datafile/sysaux04.dbf'
      resize 10G;
```

## Inference:-

The resizing of the datafile can be done up to the latest allocated extent / high water mark in the data file. By following the above steps we have re-claimed a total space of about 120GB in production and all other non-production environments. ■



## ABOUT THE AUTHORS

### Dhananjay Papde

Lead Architect & Technology Lead, SITA

Dhananjay Papde is a Lead Architect, with SITA. He has extensive IT experience on Oracle databases, E-Business Suite, BI and Oracle Fusion HCM. He is an Oracle ACE Associate and has won the Oracle Fusion Middleware Innovation Award at Oracle OpenWorld. Dhananjay is author of “Oracle Enterprise Manager 12c Administration Cookbook” and a Technical Reviewer of the book “Pro Oracle Fusion Applications: Installation and Administration”. He has also spoken at various events including Oracle OpenWorld and UKOUG Tech and Apps Conferences.



[www.linkedin.com/in/dhananjay-papde-ab798729/](https://www.linkedin.com/in/dhananjay-papde-ab798729/)



@dppapde

### V.Samara Simha Reddy

Oracle EBS, Technical Specialist, Mindtree Ltd

V.Samara Simha Reddy is an Application Administrator in Mindtree's IMTS Practice. He has over 5 years of extensive experience in implementation, maintenance and upgrade on Oracle E-Business Suite 11i, R12(R1), R12(R2), Fusion Middleware 11g, SSO, Oracle Databases, GRC application, GoldenGate and Streams.



<https://in.linkedin.com/in/samara-simha-reddy-vundyala-31a8a660>

It is not big news that IT professional services companies have traditionally placed great emphasis on the certification of engineers at recruitment stage.



## An Optimal Approach to Sitting Oracle Certifications

Rainer Schaub, Senior Oracle Database Machine Consultant, Acceleris AG

**What is rather new, however, is the fact that even for internal IT experts, companies increasingly demand candidates to be Oracle certified (i.e. OCA, OCP, or OCE). This leads to the following conclusion: An Oracle certification presents an added value for employees as well as for the employer.**

Additionally, newly acquired certifications can aid in finding a job when unemployed. I am familiar with several cases where Oracle certifications helped job-seekers to get a job in Switzerland. Interestingly, this holds true for other countries as well. For example in Spain 75% of job-seekers found a new job within six months after getting trained in Oracle technologies or were Oracle certified. (cf. [http://education.oracle.com/pls/web\\_prod-plq-dad/db\\_pages.getpage?page\\_id=927&p\\_org\\_id=28&lang=US](http://education.oracle.com/pls/web_prod-plq-dad/db_pages.getpage?page_id=927&p_org_id=28&lang=US)).

Employers appreciate when an employee succeeds in an Oracle exam. Sometimes a higher salary or a one-time bonus is granted. In other cases, achieving a certain percentage for a performance review is helpful or even necessary.

It is also important to mention that the difficulty level for Oracle certifications has become more demanding. In comparison to 10 years ago it is necessary to have experience in the domain, e.g. Oracle Database 12c, PL/SQL programming or Exadata Administration, to be successful. It is important to 'play' with

the tools (e.g. Oracle VM 3) and be curious about the result if you change an initialization parameter, or use another data-type in a field which you reference in a SQL query.

### Number of Questions and Duration

There are some Oracle exams which are as short as 75 minutes., while others can take up to three hours. The longer the duration of the exam the more questions you have to answer. One should be aware of the fact that on average you have between 70 and 90 seconds to answer a question. Therefore, it is really important to utilise your exam time wisely. This article aims to give you some hints to do so.

Anyone who takes an Oracle exam for the first time should prepare themselves for how stressful this situation can be. Therefore, it can help to take a simulative test in an environment which comes as close as possible to the actual assessment. Until last year Kaplan, and Transcender offered such possibilities for many different Oracle exams. To note Kaplan and Transcender

**OCA Exam 1Z0-061**

**Flag Question**

**Examine the exhibit.**  
Choose the statements that will execute without error. (Choose all that apply.)

A select \* from client cartesian join reservation;  
 B select \* from client natural join reservation;  
 C select \* from client cross join reservation;  
 D select \* from client join reservation;

**Show Graphic**

This is not a real Oracle exam question and there is no guarantee that it is correct.

**OCA Exam 1Z0-062**

**Flag Question**

You are required to configure Flashback Database.

1. Set the DB\_FLASHBACK\_RETENTION\_TARGET parameter.
2. Ensure that the database is in ARCHIVELOG mode.
3. Issue the ALTER DATABASE FLASHBACK ON; statement.
4. Issue the ALTER DATABASE NOARCHIVELOG; statement
5. Open the database in MOUNT EXCLUSIVE mode.
6. Configure the flash recovery area by setting the DB\_RECOVERY\_FILE\_DEST and DB\_RECOVER\_FILE\_DEST\_SIZE parameters.

Which option identifies the correct sequence in which these steps should be performed to enable Flashback Database?

A 2, 6, 1, 5 and 3 (4 not necessary)  
 B 2, 6, 4, 1, 5 and 3  
 C 1, 2, 6, 4 and 5 (4 not necessary)  
 D 1, 2, 3, 4, 5 and 6  
 E 2, 6, 1, 5, 4 and 3

This is not a real Oracle exam question and there is no guarantee that it is correct.

FIGURE 1: EXAMPLE OF A “CHOOSE ALL THAT APPLY” QUESTION

have now merged, and the organisation has been renamed: Transcender powered by Kaplan IT Training.

Passing an exam requires both knowledge about the subject (such as Oracle Database Administration) and knowledge about the type of assessment (e.g., multiple choice, language). This article aims to cover only aspects of the different types of assessment for Oracle certifications. Thus, these findings are only applicable to multiple choice and, not for an Oracle Certified Master (OCM) assessment. For information on a more general approach to prepare for Oracle exams, valuable insights can be found in Gwen Lazenby's video "Exam Preparation Tips" (cf. <https://www.youtube.com/watch?v=RcxXjN-QsbY>).

Let us look at question types and 'Magic Words'. A question type refers to special kind of questioning: on one hand it's distinctively different from other types and on the other hand requires its own response strategy. 'Magic Words' are words deserving special attention, as they hint to the examinee to eliminate or consider a specific answer.

## Marking Questions and Multiple Runs

In contrast to a GMAT exam (cf. <http://www.mba.com/us>), Oracle's certification exam questions can be marked in order to be answered later. This is very helpful, since it might be possible that answers or parts of them can be derived out of another question. Moreover, when following a coherent exam strategy, it makes sense to tackle difficult questions after a certain pool of answers has already been established. This helps save time and energy. Last but not least, it's wiser to deal with simpler questions in a first run.<sup>1</sup>

## Question Types

The knowledge of different question types and their corresponding response strategy helps save valuable examination time. It allows you to allocate resources (time, energy, concentration) better and thus increase the chances of achieving a higher rate of response. There are currently four different types of questions I'm aware of. In the following these questions types shall be explained, as well as a corresponding strategy proposal to adequately deal with these questions presented.

### Choose all that Apply

This is by far the most challenging and difficult type of question,

**OCA Exam 1Z0-061**

**Flag Question**

**Examine the exhibit.**  
Choose the statements that will execute without error. (Choose all that apply.)

A select \* from client cartesian join reservation;  
 B select \* from client natural join reservation;  
 C select \* from client cross join reservation;  
 D select \* from client join reservation;

**Show Graphic**

This is not a real Oracle exam question and there is no guarantee that it is correct.

**OCA Exam 1Z0-062**

**Flag Question**

You are required to configure Flashback Database.

1. Set the DB\_FLASHBACK\_RETENTION\_TARGET parameter.
2. Ensure that the database is in ARCHIVELOG mode.
3. Issue the ALTER DATABASE FLASHBACK ON; statement.
4. Issue the ALTER DATABASE NOARCHIVELOG; statement
5. Open the database in MOUNT EXCLUSIVE mode.
6. Configure the flash recovery area by setting the DB\_RECOVERY\_FILE\_DEST and DB\_RECOVER\_FILE\_DEST\_SIZE parameters.

Which option identifies the correct sequence in which these steps should be performed to enable Flashback Database?

A 2, 6, 1, 5 and 3 (4 not necessary)  
 B 2, 6, 4, 1, 5 and 3  
 C 1, 2, 6, 4 and 5 (4 not necessary)  
 D 1, 2, 3, 4, 5 and 6  
 E 2, 6, 1, 5, 4 and 3

This is not a real Oracle exam question and there is no guarantee that it is correct.

FIGURE 2: EXAMPLE OF A: “COMPLICATO” QUESTION

since it does not provide information about the number of correct answers and usually takes up a lot of valuable exam time and energy. Therefore, a clear recommendation: Mark questions promptly - this also applies to content-related topics where the examinee feels comfortable - and move on to the next question. The following illustration shows an example of the "Choose all that apply" question type. See Figure 1.

### “Complicato”

This type of question is characterised by its complicated structure, but has the advantage of offering only a single correct answer. First, a problem is presented as well as a list of individual steps, which might be necessary in solving the question. Subsequently, the candidate must choose the right answer from a number of possibilities. Trying to find the right sequence of steps takes up precious time and is usually doomed to failure. A good strategy is to carefully read the description of the problem, examine the list of individual steps and determine whether or not some steps are unnecessary or even need to be replicated to answer the problem.

Usually, with this knowledge, certain answers can be excluded; occasionally one may find the correct answer, in knowing that a certain operation is supposed to occur several times and applies only to a particular answer. Further possibilities in solving the question, are to compare the first or last step against all other possible responses, thus, further limiting the number of possible responses.

Furthermore, sometimes unnecessary steps are specified (not necessary). This is another sound option in knowing the correct answer. In other words, if certain steps are classified as "not necessary", but in fact they are necessary, it is clear that this answer is false. Our recommendation in this scenario is to immediately mark the question and move on to the next question. Since answering this type of question is usually time-consuming, it is best to tackle the question in a later run. See Figure 2.

### Choose 1, 2 or 3

Just as "Complicato", this question type shows the correct number of responses. It is one of the simplest. At this point, using the POE<sup>2</sup> method is beneficial. It allows to eliminate incorrect answers and, if the answer is obvious or known, to select those. See Figure 3.

www.ukoug.org

25 |

SUMMER 17

# Technology: Rainer Schaub

**Oracle Linux 6 Exam 1Z0-460**

[Flag Question](#)

View the exhibit.

```
[root@db12cvm1 etc]# pwd
/etc
[root@db12cvm1 etc]# cat /etc/cron.deny
scott
finigan
may
[root@db12cvm1 etc]# cat /etc/cron.allow
scott
may
[root@db12cvm1 etc]#
```

Examine the cron.deny and cron.allow snippet. Which statement is true.  
(Choose one correct answer.)

- A Only user root is allowed to use cron.
- B No user is allowed to use cron.
- C Only users scott and may are allowed to use cron.
- D Only users root, scott and may are allowed to use cron.

This is not a real Oracle exam question and there is no guarantee that it is correct.

Page 3 | © Acceleris AG | Zollikofen | Zürich | Renens | Bucharest



FIGURE 3: EXAMPLE OF A “CHOOSE 1, 2 OR 3” QUESTION

## Show

The specialty with this question type is that the entire information is not immediately visible on the screen, but is displayed by pressing the “Show” button. This kind of question is quite common with the certifications Oracle Database SQL Expert, Oracle Database 11g / 12c: SQL Fundamentals or also with PL/SQL certification tests. It is important to know that in approximately half of the cases these questions can be answered without knowledge of additional information. The adequate strategy would therefore be to solve the question without consulting the additional information available. Only if this is not possible, the supplementary information should be consulted by means of the “show” button. This also has the advantage of exactly knowing what information is missing for the answer and can be searched for specifically in the additional data area. I would like to note here that the difficulty with the additional information offered during the exam, is that it also contains lots of unnecessary data. See Figure 4.

In the above example, the question can also be solved without the additional information, since it is all about syntax. Knowledge about the table structure is not relevant to solve the question in this example.

## Overall Strategy on Question Types

It's recommend that you do not spend time on the “Choose all that apply” (CATA) and “Complicato” (COMP) question types on the first run, and only mark them. In the second run, solve “Complicato” questions and turn to “Choose all that apply” problems only in the third run. The “show” questions can occur in all three other types of questions, although they are usually found in “Choose 1, 2 or 3”. The response strategy for solving of the “show” questions is therefore dependent on the actual question type presented in each case. “Choose 1, 2 or 3” question types are solved in the first run, if they are simple, otherwise in the second run. Ultimately, each candidate needs to find their own strategy, however, this is an overall strategy, which I consider the best solution for this type of certification exam. See Figure 5.

## “Magic Words”

“Magic Words” are expressions deserving special attention as they hint to whether or not an answer can be considered correct or not. In the following find a sample of magic words found in an Oracle certification exam:

**OCA Exam 1Z0-061**

[Flag Question](#)

Examine the exhibit.

Choose the statements that will execute without error. (Choose all that apply.)

- A select \* from client cartesian join reservation;
- B select \* from client natural join reservation;
- C select \* from client cross join reservation;
- D select \* from client join reservation;

SQL Statement	Type
SELECT * FROM client	NOT NULL
C JOIN	NUMBER(11)
C_AGE	NUMBER(11)
SELECT * FROM city	NOT NULL
CITY_ID	NUMBER(11)
CITY_NAME	CHAR(20)
CITY_ZIP	CHAR(10)
SELECT * FROM annotation	NOT NULL
ANNO_ID	NUMBER(11)
ANNO_DATE	DATE
ANNO_DETAIL	NOT NULL
ANNO_TYPE	NUMBER(11)
SELECT * FROM reservation	NOT NULL
RES_ID	NUMBER(11)
RES_DETAIL	NOT NULL
RES_TYPE	CHAR(20)

[Show Graphic](#)

This is not a real Oracle exam question and there is no guarantee that it is correct.

Page 1 | © Acceleris AG | Zollikofen | Zürich | Renens | Bucharest



FIGURE 4: EXAMPLE OF A “SHOW” QUESTION

- ONLY
- MUST
- ALWAYS
- CAN
- CAN ONLY
- EXACTLY
- NEVER
- AUTOMATICALLY
- MIGHT

Words such as must, always, exactly and never, are words with ‘confining’ character. On a scale with possible solutions the words never or always appear each on the other extreme end. In contrast, words such as might or can, having ‘widening’ character would be found in the mid-range possible solutions. These words can be found in the majority of cases. ‘Automatically’ is also regarded as having confining character, as it leaves no room for manoeuvre. Narrowing words such as always or never indicate that the answer containing this magic word is not correct.

Application example: In the case of a Choose 2 question with five possible answers, two answers have been identified as false and one is correctly identified. For the two remaining possibilities however, the correct answer is not identified. If, in one of the two answers, a narrowing word such as never or always occurs within the sentence, then in turn the other answer should be preferred. On the other hand, if one of the two answers appears to have a word such as ‘might’, while the other answer does not contain a magic word, the might-response should be preferred.

## Mutual Exclusion

In some cases two answers are completely contradictory to each other. This is called mutual exclusion. If one answer is correct, the other answer cannot be correct. In the case of mutual exclusion, it is also important to know that usually one response will be the correct answer. A sample use case shall illustrate: In a choose 2 question with five possible answers the candidate identifies one correct and one false answer. However, with the remaining three possibilities the candidate is unsure about the second correct answer. If there is no magic word in any of these three choices, but two responses are mutually exclusive, one should choose out of these two options.

## Double Negative

A double negative is always difficult and confusing, irrespective of the presented assessment situation. In this case, it is advisable to reformulate the question into an affirmation and afterwards solve the question. In my experience, double

**Question Types: Strategy Proposal**

	1. run	2. run	3. run
CATA	no	no	yes
COMP	no	perhaps	yes
1/2/3	perhaps	yes	---
SHOW	depends on	the original	question type

Easier questions should be answered in the first run, while the more difficult ones should be answered in the second or third run.

Page 14 | © Acceleris AG | Zollikofen | Renens | Bucharest



FIGURE 5: STRATEGY PROPOSAL FOR THE QUESTIONS TYPES

negative questions rarely occur in Oracle certification tests, but they might appear.

**Conclusion**

A good technical knowledge is a prerequisite for passing an exam! An Oracle certification exam is not graded, examinees either fail or pass. It is therefore required to achieve a necessary quota of correct answers. Good knowledge about assessment types alone might not be sufficient to pass an assessment. However, it can be the decisive factor between pass and fail. Subsequently, in many cases it is useful to be as knowledgeable as possible about different frameworks. If these above mentioned statements contribute to expanding that knowledge, they have fulfilled their purpose. ■



## ABOUT THE AUTHOR

### Rainer Schaub

Senior Oracle Database Machine Consultant, Acceleris AG

Rainer Schaub is senior Oracle database machine consultant at Acceleris AG, Switzerland. With more than 25 years of experience in database technology, he has been working with Oracle databases since 1997, starting at that time with version 7.3.4.



[www.linkedin.com/in/rainer-schaub-9a9a609b/](http://www.linkedin.com/in/rainer-schaub-9a9a609b/)

1. The ideas of this chapter stem to a great deal from John Watson's book "OCA Oracle Database 12c Installation and Administration Exam Guide" 2014 McGraw-Hill Education and have been successfully applied from the author of this article.
2. POE = process of elimination

[www.efileready.com](http://www.efileready.com)

# HMRC E-filing Specialists

Specialising in **RTI, CIS, VAT, iXBRL**  
and **Pension eReturns** to HMRC  
via the Internet Channel  
(a direct replacement for the EDI channel)

Proven and well used by **ORACLE®** Users

eFileReady (*fully cloud based system*) will accept your Oracle generated files in XML, CSV or iXBRL formats and will e-file your data to HMRC via the Internet Channel, a direct replacement for the EDI channel for eReturns to HMRC. We also provide e-filing services for Companies House and Pension providers.



Send in your enquiry E-mail to:  
**Ashley.Thomas@efileready.com**

Or contact Mr. Ashley Thomas at Tel:  
**020 8452 9516**

© Copyright 2017 eFileReady Ltd, UK. All other ® & TM company or product trademarks are the property of the respective trademark owners.

“Greetings Professor Falken”

“Shall we play a game?”

“Love to. How about global thermonuclear war?”

# The Rise of the Bots

Those of us of a certain age might recognise those words from the 1983 movie WarGames: the story of a young man who hacks into a government computer system, strikes up a conversation with computer “Joshua” and nearly starts World War III.

Reflecting on the movie we can look back with a wry smile at how far computing has evolved: the character mode terminals (that inexplicably make a noise like a teletype!?), huge floppy disks and dial up phone lines. However, the movie touches on one challenge of computing sci-fi that we’re only now starting to solve even after 35 years: the ability to interact with computer systems using the same conversational language we use in our daily lives. In this article I’ll look at why, where and how we might use conversational interfaces today.

## Why Intelligent Conversation?

Well, I might say “why not? After all, intelligent conversation is how we as humans communicate. However, there is another reason why looking at conversational interfaces now makes sense. Anyone with a teenager will be aware of the massive surge in messaging platforms which are now the most popular online communication mechanisms across the planet: Facebook Messenger, WeChat, WhatsApp, Snapchat being some of the most popular of the bunch. But don’t fall into the trap of

dismissing this as a fad of the “millennial generation”. According to published research<sup>i</sup> there are over 4 billion users of messaging apps; with 6 of the top 10 mobile apps being messaging apps. Acknowledging that over half the world is already hooked into, and using, a messaging platform, is the first step in understanding why conversational interfaces may be an important channel for businesses.

However, there is another side to messaging channels which is important in understanding the “why”: the opportunity to present your business through an automated intelligent conversation.

---

**And this is where the phrase “chatbot” comes from – essentially a robot involved in one side of the conversation.**

---

Now, let’s be clear up front, we are not suggesting a chatbot is going to replace every interaction with your customers or



Grant Ronald, Director of Product Management, Oracle

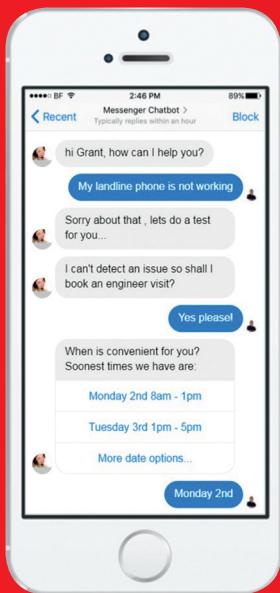


FIGURE 1: CHATBOT SERVICE

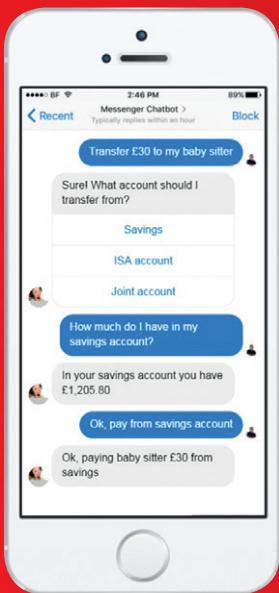


FIGURE 2: CONVERSATION WITHIN A CONVERSATION

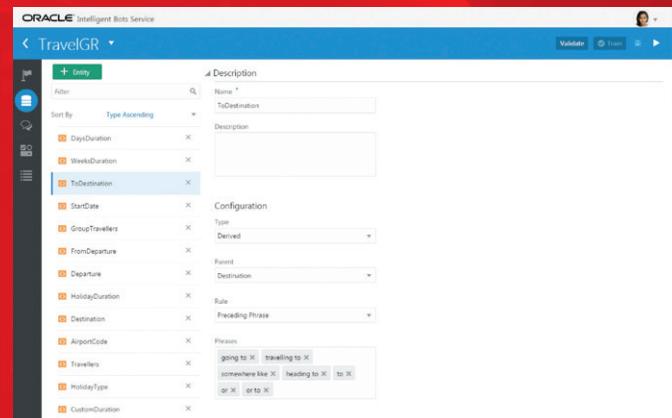


FIGURE 3: INTELLIGENT BOTS IN ORACLE

employees – that is still the stuff of sci-fi movies.

**But take a minute to think of the millions of calls made each day to call centres or your internal departments which are essentially “low tech” interactions.**

“Can you reset my password”, “What is my current vacation balance and can I book next week off”, “Can I order some toner for the printer”. Or for commercial channels: “I’d like to order a pizza”, “Where is my parcel” or “can I book a table for 7:30 this evening”.

Wouldn’t it make sense to offload those conversations to an automated chatbot and leave the more deeply philosophical discussions or complaints such as “why am I paying more tax this month compared to last month” or “the food delivery you sent was all wrong” to a human agent?

#### Intelligent Business

But don’t we already have automated phone systems that do the same thing? What’s so different?

Well, let’s take a simple example that happened to me a couple of weeks ago

to illustrate the point. I had a problem with my landline telephone. No big deal, I called my service provider and spent a gentle 10 minutes or so going through menu options, listening to music and eventually a line test was performed, no issue was found, and an engineer visit was booked for the following week.

As a customer engagement experience it was ok, however, it was fundamentally flawed. Throughout the 10 minutes I was on the phone the engagement was rigidly driven by the services the service provider could support in the order they dictated.

**That meant about 80% of the time I’m listening to options that had no relevance to why I contacted them: no I don’t have a problem with my broadband, no I don’t want to cancel an engineering visit, no I don’t want to upgrade my package.**

Let’s re-imagine how this conversation could have gone using a chatbot as shown in Figure 1.

We are straight to the issue; no menu options or music and all of which is happening at my pace: this could be a

conversation that is done and dusted in a minute, or it could be completed in between cooking and serving dinner to the family. And it’s also possible, with a well written chatbot, to allow much greater flexibility as to where the conversation flows, or what information the user can supply and the chatbot can use.

#### Getting Inside the Robot

So how does a chatbot work? How does it understand language? How can it integrate with real business data? How do you define a conversation?

#### Understanding Intent

It’s said that all roads lead to Rome, and in the chatbot world many sentences can lead to the same action. Let’s go back to our phone example above. When the chatbot asked “how can I help you”, I responded with “My landline phone is not working”. However, equally I could have said:

*“I’ve got a problem with my phone”  
“My telephone isn’t receiving calls and doesn’t have a call tone”  
“I’m having problems making calls on my landline”  
“I can’t seem to make any calls on my phone”*

I could have used one of many different phrases, with dozens of permutations of each phrase depending on whether I use “I’ve” instead of “I have”, “does not” instead of “doesn’t” or any number of synonyms such as “busted”, “knackered”,

SUMMER 17

## Technology: Grant Ronald

"dead", "screwed", "out of order", "kuput" – you get the idea.

Essentially in chatbot parlance, the intent is a use case or action the chatbot should perform regardless of the huge number of possibly different phrases the user might input to initiate that action.

Again, using the above example, there might be an intent for reporting a phone fault, I might also have an intent for cancelling an engineer, and an intent for ordering a movie.

---

### The collection of intents basically defines the functionality of the chatbot.

---

#### Language Intelligence

And here is the biggest challenge for intelligent conversation – and that is the ability to have intelligent conversation! There is a humorous example used in linguistics: "Time flies like an arrow. Fruit flies like a banana", which demonstrates syntactic ambiguity. Deferring to Wikipedia for the explanation<sup>ii</sup>: "Modern English speakers unambiguously understand the sentence... however, the matter is more difficult in the formal interpretation of natural language; formally the sentence is logically ambiguous".

---

### Basically, our brains can, in an instant, understand that in context "flies" and "like" are processed differently even though each sentence is structurally the same. But how do you program a chatbot to make those kinds of distinctions?

---

#### How to Train Your Chatbot

The point is you don't program your chatbot to process the inputs, you teach it. Most chatbot platforms rely on artificial intelligence (AI), machine learning and neural networks to "learn" about conversations so it can distinguish intents and resolve ambiguity. Whilst this is a whole separate topic on its own, let's

look at a couple of examples of how a chatbot could be trained.

#### Language independent based on samples

One way of training the chatbot is to supply sample phrases for each intent. So my ReportFault intent might consist of a number of examples as shown earlier such as "I've got a problem with my phone" and "I'm having problems making calls on my landline". An intent for cancelling an engineer might involve examples such as "The fault has been fixed no need for engineer visit" or "I don't need the engineer visit any more". Typically, you would train the chatbot with maybe 15 or 20 samples phrases which you expect to be typical examples of how the user might phrase an input which you want to resolve to the specific intent.

The process of training the chatbot would then model each of those sentences in a neural network based around algorithms which include the frequency of words, position in the sentence and other words they sit next to.

Now when a user inputs a sentence, even if it's not an exact match to any phrases associated with an intent, a probability will be calculated for each of the examples within each intent, and thus a ranking of probabilities is used to determine the most likely intent to match the phrase.

#### Natural language processing

The above example relies totally on the examples you supply. It also has no concept of understanding the actual language – it's simply taking words as tokens with no meaning. With natural language processing (NLP) you have AI which has an understanding of the language in which the conversation is taking place and can be used to influence the calculated probabilities.

Taking a very simple example to illustrate the point: "My phone is bust". Now, anyone who speaks English will inherently understand the sentence to mean that the phone is broken. However, "bust" has many different meanings. As humans we don't resolve the sentence as:

- My phone is a woman's chest as measured around her breasts
- My phone is a sculpture of a person's head, shoulders and chest
- My phone is a period of economic difficulty
- My phone is a raid or arrest by the police
- My phone is a violent blow

There are a couple of reasons we correctly resolve this sentence. Firstly, in the context of the conversation (in this case working in a call centre) we're expecting people to call up with faults or problems and the word "bust" is often associated with terms like "broken", "not working" or "faulty". The flip side is that the object of the sentence (phone in this case) might be less generally associated with sculptures, body parts or periods of economic decline.

And that, at the highest level, is natural language processing; an implied knowledge of what words mean, even though we could argue that NLP still doesn't truly understand.

NLP usually involves the language model being trained with, for example, huge bodies of literature or text which is representative of the language. This helps build a language model which can be used to help resolve user input to intents based on public usage of that language.

#### Conversation Flow

Of course, a conversation with a chatbot is more than a one shot request and response. If I tell the chatbot that my phone is broken then the conversation is going to go down a different set of steps than if I'd said I'd like to order a pay-to-view movie.

Chatbot platforms implement conversation flows which guide the interaction between the user and chatbot.

---

### And you can think of this as a good old fashioned flow chart that represents different states, or steps, in the conversation and what should happen next.

---

However, this doesn't have to be as hard-wired as in the automated telephone example. A well designed chatbot platform should be able to manage conversations within conversations as driven by the user. For example, in Figure 2, the intent is to transfer £30 to the baby sitter. The next stage in that conversation would be to get the account from which the money is transferred and then execute the transaction. However,

in this example the user interrupts the conversation to check how much he actually has in that account. Now, this is a totally reasonable thing for the user to do, but something for which the chatbot has to be prepared.

### Variables with Intent

When you look at user input, and the intents you want to match them to, you often find that specific pieces of information are variable on a case by case basis. In the example shown in figure 2, the user input was "Transfer £30 to baby sitter". But on another day, I might write "Send £100 to my ISA account". Both sentences are based around the use case of transferring money and should resolve to the same intent. However, the amount, and to whom, are variable elements, which if you follow the use case to its logical conclusion, probably maps to some parameters or data in a backend REST service or procedure call.

In a well designed chatbot you would typically look for general business use cases (such as transfer money) for which you create an intent, but then you would parameterise that intent to handle any elements that you expect to be variable. So your chatbot platform would resolve "Transfer £30 to baby sitter" to the TransferMoney intent, and would automatically set two variables

*Amount = £30  
Payee = "Baby sitter"*

Many chatbot platforms will allow you to define custom-defined variables – so you might have an enumerated variable PizzaSize which has values [small, medium, large]. This variable would then be automatically set should the input

be resolved to an appropriate intent and also contain any of the words "small", "medium", or "large". And of course, you can have more sophisticated variable matching. Someone might convey the pizza size using different terms but you still want to enumerate down to the three options of small, medium or large. In which case you can define synonyms for each of the values. So phrases like "smallest", "personal", "6 inch" would all resolve to "small".

**And as you might imagine, the rules and intelligence that you can put around resolving these variable values could be extensive.**

For example, let's take the use case of a Travel Booking chatbot. A user might ask "I'd like to book a flight from London to New York", or they might say "I want to book a trip arriving in New York travelling out of London". We as humans can quickly resolve the origin and destination even though the order in each sentence swapped around. In this case, key phrases such as "from" and "out of" give a clue to a point of origin whereas "to" and "arriving in" give clues to destination. Similarly, a chatbot can be trained to look for specific phrases which help identify the variable elements in a sentence.

Finally, there are often common factors in all chatbots such as dates, times, currency, address, emails which vary on a case by case basis. Consider if your platform could intelligently work out any times and durations that a user inputs in natural

language. For example "How much did I spend on my credit card last month" would automatically resolve "last month" to two variables, one which is the first day of the previous month and the second which is the last day of the previous month.

**And the phrase "what did I spend on my credit card yesterday" would similarly automatically resolve "yesterday" to an explicit date.**

### Oracle and Intelligent Bots

So is Oracle playing in the chatbot field? Absolutely! At the time of writing this article (April 2017) we've just completed global training of our internal mobile specialists on our Intelligent Bots service. Intents, entities, AI, NLP and dialog flow are all building blocks of our service. We are planning to make this a feature of our Mobile Cloud suite of products which strengthens our position of multi-channel mobile and also allows the chatbot channel to make use of existing mobile features such as mobile-specific-APIs, geo-location services and connectors to back end systems.

This gives you a common cloud service from which to manage your different engagement channels, mixing and matching mobile, web, intelligent chat AND real users.

Keep an eye out for a follow up article diving into the details of building a chatbot on the Oracle platform. ■



### ABOUT THE AUTHOR

**Grant Ronald**  
Director of Product Management, Oracle

Grant Ronald is Director of Product Management within Oracle's Mobile and Intelligent Chatbots division responsible for product strategy, evangelism and technical enablement. He has been with Oracle for over 20 years, previous to which he was a developer at EDS Defence. He is the author of "The Quickstart Guide to Fusion Development", winner of UKOUG Lifetime achievement speaker award and is a regular presenter at Oracle OpenWorld, Oracle User Groups and other technology conferences.



[www.linkedin.com/in/grant-ronald-ba4392/](http://www.linkedin.com/in/grant-ronald-ba4392/)



@gvronald

The preceding is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

i. Sources: BI Intelligence, Jan. 2016 and Statista, April 2016  
ii. [https://en.wikipedia.org/wiki/Time\\_flies\\_like\\_an\\_arrow,\\_fruit\\_flies\\_like\\_a\\_banana](https://en.wikipedia.org/wiki/Time_flies_like_an_arrow,_fruit_flies_like_a_banana)

# Extending Cloud HCM is as Easy as



**Human Capital Management Cloud, or HCM SaaS has high adoption within an organisation, self-service gives all employees the ability to see and manage their personal data, and they love it, so why not extend it to include all those other things you need to share with your employees?**

Debra Lilley, Vice President, Certus Solutions 

**Application Builder Cloud Service (ABCS) is a low code development platform that makes this really simple, and something a super-user or more likely an administrator can do quickly and cheaply.**

ABCS is part of the Platform as a Service or PaaS portfolio. It is the entry level for what is being called PaaS4SaaS or Enrich SaaS with PaaS.

#### **But you can't customise Cloud applications?**

That is true, we can't change the data objects or write new processes within the Cloud HCM and ERP Applications, it is slightly different within some of the CX Applications, but I am talking about HCM SaaS in this article.

What we can do though, is write a mini application and call it from the Employee Self-service screen.

*Caution: The new application is navigated to, executed, and you return to where you were in the SaaS application; it cannot be injected into a SaaS process.*

#### **If it is that easy – explain it to me**

No problem. Your organisation probably has lots of things that need employee information, and may just be a spreadsheet that gets emailed around, or a survey.

I can create a simple app for your employees; let's say to request permission to attend UKOUG Conference in December. Once you have the requests you will be able to determine how many places are required and either determine who to approve or better still purchase some additional tickets (at the member rate).

ABCS will be installed alongside your HCM SaaS. Oracle has priced ABCS very low, less than a couple of coffees a day per user, minimum 5, to drive adoption. It is licenced against the number of ABCS users, i.e. the number of people who can create an application, not the number of people using the application or number of applications developed. At this stage I am suggesting using ABCS to get rid of some of those manual lists, excel spreadsheets and surveys that live in any organisation.

This is not a step-by-step guide, I am covering just the concepts, but there is an amazing collection of videos and blogs available for ABCS – just Google 'Oracle Application Builder'.

#### **Data Design**

Originally ABCS was pitched as Citizen Developer or Low Code. I am not particularly technical and definitely not a practitioner today, but I have been in the past and understand what is going on. You do need an, albeit basic knowledge, of how to put together a simple design.

Creation of an application is very simple and wizard driven, just give it a name and select your user interface theme. For me it is the Applications Cloud UI, so my employees will not see 'the joins' to my new application, as the look and feel of the ABCS application matches the HCM SaaS.

Every application starts as a project, and each project needs at least one object, which sits in your ABCS database. However, the object will not be available within your SaaS application; you will not be able to report on it with BI Publisher.

As I am walked through the creation I can add logos, and text to make it more 'mine'.

### Conference Dates

In my example, we need a list of the dates available. Then employees can then create a request. As I need them to give a justification for each day they wish to attend, I need separate requests for each day they are asking for.

### Requests

I could have a single object and simply give a list of values for the dates, but then I cannot aggregate the requests. To do that I need a master detail relationship. I then added the 4 dates into the first object.

The Request object is a little more complex. It needs 3 fields:

- Name, linked to the name from our HCM SaaS system
- Day, which is a field, linked to the first data object (the 4 dates)
- Justification, a simple text field

**Name** - I want a person's name; these are held as employees in HCM SaaS, and available to us via a REST API. An API is a set of functions and procedures that allow us to create our own application that accesses the data of another application, in this case HCM. Within ABCS any APIs used are simply an external object that can be referenced.

When you purchase ABCS it will be provisioned alongside your HCM SaaS instance and at this point when you create a new object, from an external source, it will auto detect the available APIs. When using a trial version of ABCS as I am, I have to make the API known, by adding the URL. I also set it up with basic security that means I enter my username and password from HCM SaaS, as I have a role that can access the APIs.

APIs in HCM SaaS are currently under controlled availability, which means you need to request them. Check Oracle Doc ID 2230339.1 for details.

```

{
  "Resources": {
    "emps": {
      "discrColumnType": false,
      "attributes": [
        {
          "name": "Salutation",
          "type": "string",
          "updateable": true,
          "mandatory": false,
          "queryable": true,
          "allowChanges": "always",
          "precision": 38,
          "title": "Title",
          "controlType": "choice",
          "maxLength": "30",
          "long": true,
          "childRef": "SalutationLOv",
          "attributeMap": [
            {
              "source": "LookupCode",
              "target": "Salutation"
            }
          ],
          "displayAttributes": ["LookupCode", "Meaning"]
        },
        {
          "name": "FirstName",
          "type": "string",
          "updateable": true,
          "mandatory": false,
          "queryable": true,
          "allowChanges": "always"
        }
      ]
    }
  }
}

```

In this example I am going to have a drop-down list that gives me all employees, but again if ABCS was provisioned alongside my HCM SaaS then the new application could have a condition to return only the name of the person logging in. Additionally, single sign-on between HCM SaaS and the published ABCS application is also available.

**Date** - selection is linked to our first or parent object.

**Justification** is a simple alphanumeric field.

Once you have designed your application, and are happy with it, it can be staged. This means it can be accessed externally as a test, and once you are happy with that you can publish it.

This is when we can link it to HCM SaaS. I can add a button to the home page using the Structure functionality within HCM SaaS, and add the static url of the published application. When selected the ABCS application opens a new iFrame to run, and when completed you return to the HCM SaaS homepage.

SUMMER 17

Cloud: Debra Lilley



### But I could simply have sent a survey out

Absolutely, but here you have the advantage that it is coming from the self-service HCM SaaS, not in a separate email to be ignored, or a forgotten survey. You could further use the HCM SaaS homepage notifications to announce the application.

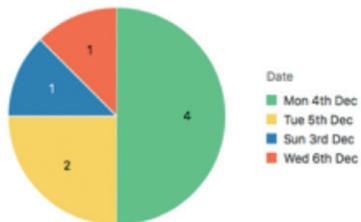
Name	Date Requested	Justification
	Sun 3rd Dec	
	Mon 4th Dec	
	Tue 5th Dec	
	Wed 6th Dec	

Another advantage is that as soon as the application has finished its objective, it can be simply removed from the menu, or even deleted completely. Data from your application can be exported to excel from within ABCS, not by the end user.

Name	Date Requested	Justification	Actions
Elizabeth Edwards	Mon 4th Dec	great app content	
Patsie Costello	Sun 3rd Dec	I'm a real Geek	
Patsie Costello	Mon 4th Dec	keynote looks amazing	
Eva Prossed	Tue 5th Dec	JDE keynote a must	
Lesley Docherty	Mon 4th Dec	keynote looks good	
Paddy Lowe	Wed 6th Dec	partner sessions look interesting	
Ramya Govindarajan	Tue 5th Dec	want to do a UX lab	

I can also create graphics to show the most popular days, this is why I wanted an aggregation in my data design.

### Bookings by Date



ABCS also includes the ability to create a simple mobile app, however today it doesn't support SaaS APIs but it is coming. Perhaps that could be my next article... ■



### ABOUT THE AUTHOR

Debra Lilley

Vice President, Certus Solutions

Debra is a VP of Certus Cloud Services, an Oracle ACE Director and a Member Advocate at UKOUG. She is passionate about the user experience and continuous innovation that SaaS delivers. Debra has worked with Oracle Applications for 20 years and now works exclusively with Cloud applications.

Blog: [debrasoracle.blogspot.co.uk](http://debrasoracle.blogspot.co.uk)

[Uk.linkedin.com/in/debralilley](https://uk.linkedin.com/in/debralilley)

[@debralilley](https://twitter.com/debralilley)

**Velocity**

**Full Stack Oracle Apps  
Expertise So You Don't  
Have To Do It.**

**GET THERE FASTER WITH VELOCITY.**



300+ Global Oracle Resources



Managed Services Partner for  
Oracle Cloud



Unparalleled applications  
expertise delivered by VCAMP™

**CONTACT US**

VelocityCloud.co.uk/Contact  
+44 (0) 141 202 6300

**ORACLE** Platinum  
Partner

# Three Reasons

**Companies are Outsourcing Management of Their Oracle Hyperion EPM/BI Systems**

IT executives are under constant pressure to drive down the cost of mission-critical business applications without sacrificing the quality of service delivered to internal stakeholders. That pressure has brought to the forefront questions and decisions about what to outsource and when, understanding that making the move can deliver significant wins for an IT organisation.

## Why outsource Enterprise Performance Management/Business Intelligence (EPM/BI) Systems such as Oracle Hyperion?

While some companies choose to keep their mission-critical ERP, or transactional systems in-house, more and more companies are engaging trusted partners to move and manage their EPM/BI systems in the cloud. Why?

Here are the most common reasons companies are considering this approach:

### 1. Risk mitigation: Talent acquisition/retention challenges

– Finding, and ultimately retaining, quality Hyperion resources can be a significant source of pain for IT and finance organisations. Hyperion talent is in high-demand and acquiring it can be an expensive venture. Many companies are constrained by their geography and find it difficult to attract experienced Hyperion resources to more remote corporate headquarter locations. Even areas with an unlimited supply of Hyperion talent are presented with the challenges of turnover: the real and intangible costs to recruit, on-board, train, and retain a new Hyperion resource every 12 months can wreak havoc on IT/finance budgets and impede ongoing business processes. Outsourcing to an experienced Hyperion service provider can minimise these costs and reduce organisational risk.

### 2. Focus on core competencies: Reduce conflict between IT/business

– EPM/BI applications are relatively new to companies' IT portfolios and the skillset required to manage these solutions is still fairly rare. IT teams are often overtaxed in trying to keep pace with the workload in managing their Hyperion systems only to receive constant complaints from Finance about performance, availability and functionality. Is this the best use of their time? You could consider working with a partner whose experience is supporting Hyperion, and return your team's focus to more strategic initiatives that support your daily business operations. It is not unusual for IT teams to struggle with daily Hyperion support because they're trying to manage it like an ERP system or an email platform. It simply does not work like that. Enterprises should focus their valuable resources on systems that align with the business' core competencies. If your business manufactures specialty chemicals, deploy your IT resources in support of

your process manufacturing systems instead of your financial reporting application. It's about opportunity cost.

### 3. Cost reduction: Controlling the Total Cost of Ownership (TCO) for Hyperion

– As an IT or Finance Executive, you've now selected the Hyperion modules your organisation needs, you've expended the capital to purchase licenses and hardware, and the implementation is nearly complete on-time and on-budget. So all your costs are accounted for and incurred, right? Wrong. Between database administrators, Hyperion infrastructure resources, functional experts, and developers, many case studies indicate that the annual cost to support Hyperion in-house on a 24/7 basis can range from £120k to £400k. To make matters worse, those numbers don't include the costs of fractionalised resources or the risks associated with inevitable attrition. Even if your company plans to host Hyperion in-house, remote managed services from an experienced Hyperion partner can easily deliver a 50%+ reduction in annual costs to support your applications. Add to that number the value of increased service quality and watch the cost of ownership plummet and the return on investment soar.

While the decision criteria to outsource EPM/BI applications may vary for every organisation, the drivers above represent a compelling business case in almost every scenario. ■



## ABOUT THE AUTHOR

### Martin Greenshields

Director Sales & Customer Program Manager (EMEA), Velocity

In his role as Sales and Customer Program Manager for EMEA, Martin works with enterprise leaders across many verticals and regions, and is considered a valued and trusted advisor by them as they seek to navigate the opportunities and challenges within an ever changing ERP world.



[uk.linkedin.com/in/martingreenshields](https://uk.linkedin.com/in/martingreenshields)

# How to Cook a BI Story



Federico Venturin, Consultant, Rittman Mead

Good dashboard design is as important as a good common enterprise information model in OBIEE, but not everyone knows this and many have forgotten.

This article looks at the process of building a BI story from scratch in OBIEE. It discusses good practices for understanding end user requirements, selecting meaningful content, creating effective visualizations, and designing attractive dashboard layouts.

**Bad dashboard design can have a profound impact on user adoption and overall system performance. Unfortunately, the standard practice for laying out most dashboards and reports is often to simply fit everything on the page in muddled mass of information.**

Good dashboard design should tell a story with data: there should be a starting point, themes, segues between chapters, and a conclusion to help users travel a path through the presented data in a way that they can move their understanding forward.

Nevertheless, I prefer to think about dashboard designers as chefs rather than authors: they manage the kitchen (presentation catalog), and choose quality ingredients (data) at the food market (BI repository) to prepare BI stories for consumption.

## Knowing End Users' Tastes

It's crucial to gain a deep knowledge of end users to prepare a good BI story. A common mistake is to think about them as experts and ask for dashboard design requirements: have you ever heard of a chef asking for recipes from their customers?

- What information are they using on a daily basis?
- How much time do they have?
- Do they enjoy digging into the numbers?
- How familiar are they with the data?

## A must for some may be a true culinary sin such as spaghetti with ketchup or 3D in charts.

A better approach is to ask questions to understand their business processes and how they interact with data:

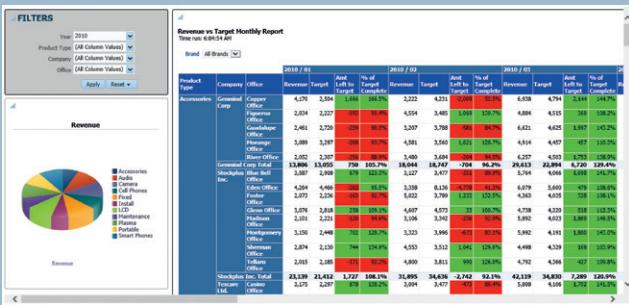
- What decisions do they make?
- What questions do they need answered?

## Choosing the Ingredients

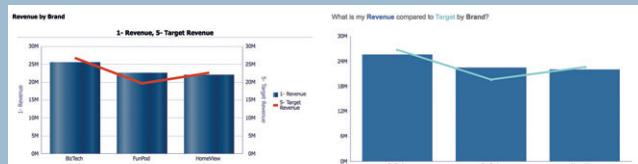
Trying to include everything into a single BI story is the best way to fail. Content overload may result in confusion, clutter and excess of complication with a serious risk to not meet expectations and deadlines.

It's recommended to focus on a single business process at the RPD food market, and:

- Identify the most important metric – the protagonist. Similar metrics can be compared, but unrelated ones are like



**FIGURE 1:** An example of bad dashboard design. This dashboard has too much detail and the user has to spend time (and scroll) staring at the raw data to understand what's going on. The amount of colour is distracting and makes it complicated to understand. Data graphics should draw the viewer's attention to the sense and substance of the data, but it looks like the pie chart has been included only to fill blank space on the left-hand side of the page. Also, since the legend is separate from the visualization, the user has to look back and forth to read the chart.



**FIGURE 2:** Default (left) vs. clean (right) line-bar chart. Which one is the most attractive? Special effects, redundant labels, and gridlines should be removed to make it easier to understand.



**FIGURE 3:** Default (left) vs. clean (right) table view. Which one is the most attractive? Alternating row style, fixed width for all columns, colours, and padding should be used to make it easier to understand.

different pasta shapes: they should not be mixed. Ever!

- Identify the most important business drivers. Business drivers are like pasta sauces: the most delicious are also the easiest and require no more than 3-4 ingredients.

It's worth noting that data not included will not be lost, but can be used in a detailed chapter or to prepare a complete new story.

## Cooking the Ingredients

A good BI story must contain tasty data, be quick to prepare and easy to understand.

**My secret recipe is based on performance tiles, line-bar charts, table views and action links to provide guided navigation.**

- Create a performance tile for each key metric. Performance tile is my favourite visualization for displaying and calling out attention to a metric, and the ideal place to apply conditional formatting rules without turning a dashboard into a Christmas tree.
- Create a line-bar chart for each business driver. A line-bar chart clearly indicates how the values relate to one

another, and makes it easy to compare and see the ranked order of values.

- Create a table view for each business driver. Table views express values precisely, allow end users to dig into the numbers and it's the ideal way of looking up or comparing individual values.
- Questions are more effective than report titles. Consider creating Static Text views with HTML markup to highlight the names of metrics and business drivers.
- Don't accept the default and clean visualizations: remove special effects, redundant labels and gridlines. Less is more attractive and easier to understand.
- Use soft pastels to unnatural colours because they make people feel calm and cool. Use one colour to visualize one element, and be consistent. Use different colours when they correspond to different things, such as comparing measures in line-bar charts.

## Plating Up

According to Nielsen, most users scan a webpage from top left-hand corner towards the right, then return to the left side, move down and then to the right again. Continuing in this way, a capital F pattern is traced out, with most of the focus in the top left-hand corner.

A good dashboard layout must guide user focus to what is most important:

- Present information in a one-column format rather than in multiple-column

format because it gets read more extensively.

- Place dashboard prompts in a column across the top or down the left-hand side of the page. Whichever is used, make it a standard and stick to it for all future pages which require dashboard prompts.
- Place performance tiles across the top of the page.
- Place line-bar charts and table views for the most important business drivers first.

People don't like to scroll, but they do if the layout is designed to encourage scrolling:

- Design dashboard layout to the resolution of end users' screens.
- Use the Freeze Column option in a dashboard column to keep the context (e.g. prompts) while scrolling the rest of the page.
- Use the Fixed headers with scrolling content option to keep headers of rows and columns always visible when browsing big tables.

Jakob's Law of the Web User Experience states that "users spend most of their time on other websites". This means that they form their expectations for a dashboard based on what's commonly done on most other dashboards. When deviating, the dashboard will be harder to use and users will leave. Consistency is one of the most powerful usability principles: when things always behave

SUMMER 17

## Business Intelligence: Federico Venturin



FIGURE 4: An example of good dashboard design. It's worth noting that it presents the same data as in Figure 1, but it's more attractive and easier to understand. Prompts and conditions can be used to switch between line-bar charts (left) and table views (right).

the same, end users don't have to worry about what will happen.

### Providing Street Food Options

Mobile overtook desktop computers as people's preferred device to access the internet in 2016, and that trend is forecast to jump this year. A solution to provide access to BI stories from mobile devices with the minimum development effort has become required rather than desirable.

**Oracle BI Mobile HD app for iOS and Android allows to you to view and interact with OBIEE content on mobile devices in a better way than using a browser.**

The bad news is that OBIEE has no responsive web design capability. This means that BI stories will not get automatically resized to fit the screen size on mobile devices.

To overcome the issue:

- Design dashboards to the minimum resolution between desktop computers and tablets.
- Add an ad-hoc compound layout for mobile screens to each analysis.
- Use dashboard prompts and conditions to allow users to switch between desktop and mobile layouts at run time.

As an alternative, Oracle BI Mobile App Designer (MAD) can be used to create visually engaging HTML5 apps. These apps detect the device screen size and automatically adjust the app display. Unfortunately, MAD's engine is based on BI Publisher technology and existing OBIEE dashboards/analyses must be rebuilt from scratch.

### Automating Repetitive Tasks

There are some differences between food and BI stories: you can't eat a BI story, you can't export food to Excel, but it's possible to automate repetitive tasks for both food and BI story preparation.

Each catalog object is actually a XML file and OBIEE session-based web services

can be used to build a BI story stand mixer. In particular, SAWSessionService provides authentication methods while WebCatalogService provides methods for managing the catalog.

Automated processes increase productivity, reduce human errors, and will always run the same way at the same speed. Moreover, a workforce that is not bored by undertaking repetitive tasks will be happier.

### In Summary

- Do not ask for dashboard design requirements from end users
- Use performance tiles, line-bar charts, and table views
- Use action links to provide guided navigation
- Decide on the dashboard layout and be consistent
- Automate repetitive tasks ■



## ABOUT THE AUTHOR

**Federico Venturin**  
Consultant, Rittman Mead

Federico is a Consultant at Rittman Mead and an OBIEE enthusiast. He built his expertise with OBIEE and focused on attractive dashboard design and performance analytics.

He is involved in the OBIEE community by providing support on OTN forums, blogging on the Rittman Mead website and speaking at various conferences.

Blog: [www.rittmanmead.com/blog](http://www.rittmanmead.com/blog)

[@barretbse](http://www.linkedin.com/in/federico-venturin/?locale=en_US)

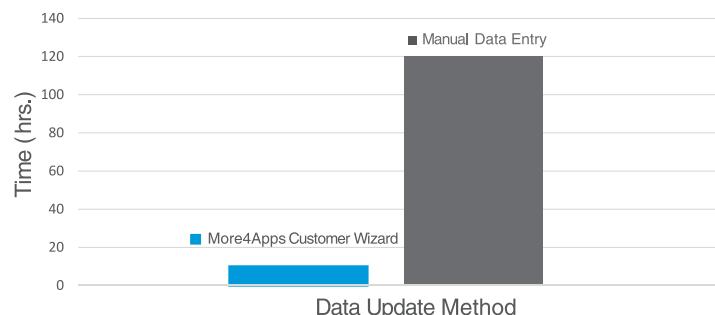


## Who said getting data into Oracle EBS should be difficult?

*"Updates were performed within hours, not weeks and we could remove the additional costs in time and labor of the IT department as they no longer needed to write scripts to make mass changes."*

- Jamie Lynne Weingard  
American Red Cross

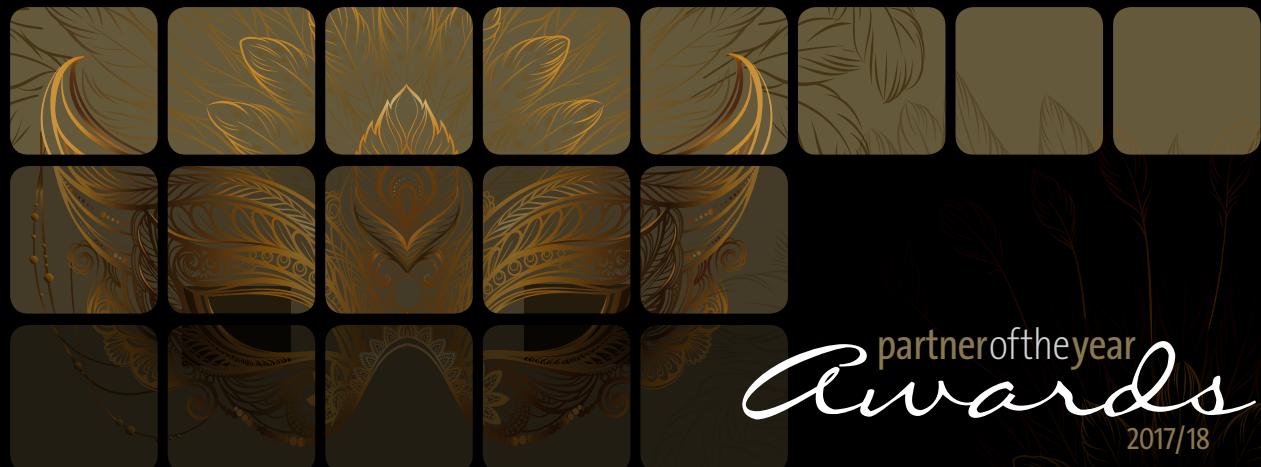
Time taken by American Red Cross to update 7213 records in a conversion project using More4Apps Customer Wizard vs. Manual Data Entry



[More4apps.com](http://More4apps.com)

12 OCTOBER 2017

THE HURLINGHAM CLUB | LONDON



Our partners have been nominating themselves for a chance to win one of the coveted UKOUG Partner of the Year Awards. This year's awards consist of 20 categories chosen to reflect all aspects of the Oracle industry.

The shortlisted nominees will be announced in July and then these partners will then be looking to the Oracle end user community for votes in recognition of the work delivered and contributions they have made to the Oracle community.

Winning an award is a great endorsement for a business and in our 10th year of running the awards the celebration is guaranteed to

be even bigger. The winners will be announced at our masquerade themed award ceremony in October.

To find out more about the awards visit [www.ukoug.org/pya](http://www.ukoug.org/pya) or follow the event news on Twitter via hashtag #ukoug\_pya. If you have any questions regarding the awards or voting, please contact [lois.hunt@ukoug.org](mailto:lois.hunt@ukoug.org).

# Ask JONATHAN

## QUESTION 1:

### Column Groups and Dynamic Sampling

I have the following demonstration running under 12.1.0.2:

```

create table t as
select a.* ,
       decode( mod(rownum,2),0,'Y','N') flag1,
       decode( mod(rownum,2),0,'N','Y') flag2
  from all_objects a
 where rownum <= 40000
;

create index t_idx on t(flag1,flag2);

begin
  dbms_stats.gather_table_stats(
    user, 'T',
    method_opt=>'for all indexed columns size 254 for
    columns (flag1,flag2) size 254',
    cascade =>true
  );
end;
/
set autotrace on explain
select count(*) from t where
flag1='Y' and flag2='Y';
select /*+ dynamic_sampling(t,4) */ count(*) from t where
flag1='Y' and flag2='Y';

set autotrace off

```

*There are no rows satisfying the query but the optimizer predicts 10,000 rows unless I force dynamic sampling with a hint. Using the explicit table-sampling version of the hint at level 4 the predicted cardinality drops to 1. Since we have sufficient statistics (basic column level statistics, histograms on the indexed column, extended statistics and histograms on the extended stats) why does the optimizer still need the dynamic\_sampling hint to report the right cardinality? Why not make use of the histograms on extended stats to report the right cardinality?*

I've modified the question (specifically the DDL) to work with 40,000 rows so that I could produce some easily identifiable numbers in the arithmetic. As a result the 10,000 cardinality predicted by the optimizer looks fairly meaningful, but it's open to misinterpretation. On the surface it looks as if the optimizer may have said: "there are 2 values for **flag1** and 2 values for **flag2**, which makes 4 possible combinations – which gives 10,000 rows per combination". This demonstrates the problem of how careful you need to be when creating tests; this set of data is very "special" – it's too uniform: if, for example, you see a number that looks as if you have to "divide by two", is that because

there are 2 values for **flag1**, 2 values for **flag2** or 2 values for the combination? Could that 10,000 have appeared by a more subtle mechanism? Before doing anything complicated like looking at an optimizer trace (event 10053) I re-ran the test but included this update before gathering the statistics:

```
update t set flag1 = 'N' where flag1 = 'Y' and rownum = 1;
```

This introduced a row with the values ('N', 'N') – we still don't have any rows with the combination ('Y', 'Y') – but with this one modified row the optimizer produced a cardinality estimate of 1. This is a feature of histograms – we were asking for a value that doesn't appear in a frequency histogram, and in those circumstances the optimizer uses half the frequency of the least common item in the histogram to calculate the selectivity. Until we introduced the one special row the extended stats histogram held only two combinations with 20,000 rows each, so the requested "missing combination" was considered to be responsible for 10,000 rows.

It's worth pointing out a couple of details about the test data – the presence of the index tells the optimizer that there are only two combinations of (**flag1**, **flag2**), so the column group definition was redundant (at least until we created the histograms).

The histograms were also redundant because there is no skew in the **current** data, but they have demonstrated an important threat of frequency histograms, specifically you may have created a histogram because you know that a very small number of rows hold "rare" patterns – but if you generate the histogram when those rows don't exist (or, in versions older than 12c, use the default, small, sample size that happens to miss all the critical rows) you may end up with a histogram that uses the "half the least frequent" rule to get a very bad cardinality estimate.

If you do run the tests using version 12.1.0.2 you'll find that despite setting level 4 in the **dynamic\_sampling** hint the "Notes" section of the execution plan will report sampling at level 2. It's the note that's wrong, the sample size will be the 128 blocks dictated by level 4. ■

If you have a question or problem around: performance, trouble-shooting, optimizer behaviour or internals, which can be described in a few sentences and would like an expert opinion, then try “Ask Jonathan”, a new feature for Oracle Scene. In each issue Jonathan Lewis will respond to a short list of questions sent in by readers on any topic relating to making best use of the Oracle Database engine. Anything related to efficiency will be considered, but questions that will be of interest to the wider audience are more likely to be selected.

Submit your questions, listing the topic area to editor@ukoug.org. Jonathan may summarise your question and, with your prior agreement, may contact you to fill in a bit of background.

## QUESTION 2:

### Adaptive Feature Concerns

*Should we have more control over the optimizer's “adaptive features” - what is available to us now?*

The biggest problem with optimisation is that there will always be cases where there's not enough information available to make a good decision, and not enough time to acquire that information. The first attempts to deal with this were “adaptive cursor sharing” and “cardinality feedback” where the code monitored “suspect” queries as they executed and accumulated run-time statistics from one execution, to help it do better on subsequent executions – either by re-optimising it using previous run-time stats, or by allowing it to accumulate a set of execution plans that might be appropriate to different input bind variables. The biggest drawback to these two strategies was that the optimizer had to make mistakes before it learned how to do better – and then it forgot what it had learned because it didn't record any information about statements and their paths across flushes of the shared pool.

In 12c these two features evolved into “adaptive execution plans” and “adaptive statistics”. The first feature attempts to “get it right first time” rather than having to learn by its mistakes, the second tries to keep track of how misleading the basic stats are so that it can take the minimum amount of defensive action (acquire better stats) while optimising future queries that look similar.

**Both features have been praised for some great successes, and both have been damned for some great failures – though people tend to make more noise about failure than success, of course.**

Adaptive execution plans allow the optimizer to say things like: “at this point I think I'll have 10 rows so I'll do a nested loop join, but if I find at run-time that I've got more than 160 rows I'll do a hash join”. The cost of this feature is the time spent by Oracle trying to work out whether there are alternative paths to consider and when it should take them, but on the whole the feature has worked quite well.

Adaptive statistics is a label that covers a sequence of events that leads (according to a blog I wrote) to “adaptive mayhem”. For suspect statements Oracle will track run-time statistics and record (in memory) some hints that tell it something about fixing up the statistics for problem **objects** in those statements; after a short period of time those hints will be written to disc as SQL Plan Directives, and over the next 24 hours some of those directives will be used as the basis for adding, creating and gathering extended stats.

**There have been a number of complaints about the instability this has caused – often due to the work done as Oracle tries to follow the SQL Plan Directives and gather extra statistics as part of the optimisation stage.**

Initially 12c (12.1.0.2) gave us just one parameter (*optimizer\_adaptive\_features*) to enable or disable both features, although there is a parameter (*optimizer\_adaptive\_reporting\_only*) to limit the adaptive plans feature to a reporting-only status and a hidden parameter (*\_optimizer\_adaptive\_plans*) that can be used to disable adaptive plan generation completely. There are also a couple of hidden parameters about “feedback” that could disable and “ads” that could have some effect on how Oracle uses dynamic sampling and cardinality feedback.

In 12.2 Oracle Corp has (perhaps in response to feedback from the community) added a new parameter that allows us to enable or disable the adaptive statistics feature (*optimizer\_adaptive\_statistics*) which, interestingly, defaults to false.

To give a direct answer to the first part of the question, then: yes, we should have more control over the optimizer's “adaptive features” – and in 12.2 Oracle has given us the control we need. Whether we should have a finer granularity of control is another matter – it's available through some hidden parameters, and I think that's probably appropriate. ■

SUMMER 17

Technology: Jonathan Lewis

# Ask JONATHAN

## QUESTION 3:

### VMWare

#### *Am I safe to run Oracle on VMWare from a support perspective?*

When it comes to contractual rights and obligations don't believe what anyone says get it in writing from a suitably authorised member of the Oracle staff – and then make sure you don't sign a contract that says any other bits of paper are null and void.

Having said that, the latest information I have comes from a note on MoS (which means it's not contractual) is Doc ID: 249212.1 "Support Position for Oracle Products Running on VMWare Virtualized Environments" which basically makes two points:

Oracle has not certified any of its products on VMWare virtualized environments.

Oracle Support will only provide support for Oracle products on VMware for issues that either are known to occur on the native OS or can be demonstrated not to be a consequence of running on VMware.

To my mind this suggests that for some issues you may need to migrate a database-instance from a virtual machine to a physical machine to prove that an issue is not due to VMWare. For example, you shouldn't need to reproduce a bad choice of plan by the optimizer on a physical copy of the database; on the other hand if you have a latch contention problem with no obvious explanation then you may need to show that it still occurs in the absence of the virtualization layer.

Consequently, if you are a large organisation with many databases, you might decide that VMWare is okay for 99.9% of your databases but the remaining databases are sufficiently important (or unwieldy) that they have to run on a native OS. ■



## ABOUT THE AUTHOR

**Jonathan Lewis**  
Freelance Consultant, JL Computer Consultancy

Jonathan's experience with Oracle goes back more than 25 years. He specialises in physical database design, the strategic use of the Oracle database engine and solving performance issues. Jonathan is the author of 'Oracle Core', 'Cost Based Oracle – Fundamentals' and 'Practical Oracle 8i – Designing Efficient Databases' and has contributed to three other books about Oracle. He is one of the best-known speakers on the UK Oracle circuit, as well as being very popular on the international scene, having worked or lectured in 50 different countries. Further details of his published papers, presentations and tutorials can be found through his blog.

Blog: [jonathanlewis.wordpress.com](http://jonathanlewis.wordpress.com)



@JLOracle



# Join UKOUG & your network is within reach

From conferences and Special Interest Groups, to Oracle Scene and online resources, become part of a network where users, partners and Oracle collaborate, learn and share together.

We have a variety of membership packages to suit your individual, team and business requirements with prices starting at just £165+VAT.

Contact the membership team on [info@ukoug.org](mailto:info@ukoug.org) / Tel +44 (0)20 8545 9670 to find out about our current offers and to discuss the right package for you [www.ukoug.org/join](http://www.ukoug.org/join)

# UKOUG CONFERENCES ARE COMING...

4-6 DECEMBER 2017  
ICC BIRMINGHAM, UK



The largest  
independent  
gathering of  
Oracle users in  
the UK



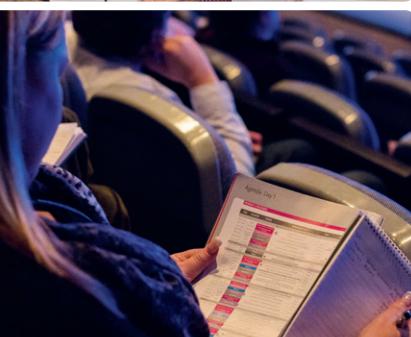
Call for speakers:  
Open until 26th June  
2017

## APPS*i7*

Share your Oracle  
knowledge:  
Help others to  
achieve their  
strategic objectives



## JDE*i7*



Find out more and  
register your interest at:  
[www.ukoug.org/  
conferences](http://www.ukoug.org/conferences)

## TECH*i7*

Agenda live:  
September 2017



Allow others to learn  
from your real-world  
experiences