

ORACLE 11G DATABASE REPLAY : CAPTURE WORKLOAD PROCESS

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INTRODUCTION

In this document I will provide details as how you can use Oracle 11g database replay feature. This feature will help DBA's to perform Real-world load testing similar to production environment on QA or new platform. Oracle 11g allows to capture Database Workload from production environment at the cost of some system resources and then this load can be played on any other system irrespective of operating system and architecture and will help management and technical people. This feature will not only help the companies in performing Real-world testing but also save money to buy expensive testing tools. It will also save lots of time spent in configuring third party testing tools and moreover will provide more accurate testing results

In this paper, I will use db02pn as Source Database and db01pn as Target Database. Source Database is the database where Workload is captured and then the workload will be replayed at Target database.

DATABASE REPLAY SETUP STEPS

1. Take a Backup of Source database.
You can use any Database backup procedure that can take the Source Database/schema backup and can be restored on Target Database.
2. Configure Oracle EM database console on both Source and Target Database
If you want to use EM console which is recommended tool for Database replay setup.
3. Start the Capture process to record Database activities on Source Database
4. Apply load to the Database
I used Visual Basic application to access the database and capture the corresponding load in .rec files created by DBReplay on the Database server.
5. Restore the Backup taken in First Step on Target Database
This step will help to compare the workload on Source and Target Database.
6. Reset the Time on Target Database close to Source Database Capture Time – Optional
This will help to avoid any divergence in test result while comparing the workload due to SQL function like SYSDATE or SYSTIMESTAMP
7. Copy the Captured Data as physical files on Source Server to Target Database Server
These are the .rec and some .dmp physical file that stores the Captured Workload information of Source Database server.
8. Processed the Captured workload on Target Database
9. Replay the Workload on Target Database
10. Analyze the Report

CAPTURE WORKLOAD STEPS

1. Take a Backup of Source
2. Configure EM Database Console
3. Capture the Workload using Enterprise Manager
4. Capture the Workload using API

TAKE A BACKUP OF SOURCE DATABASE

I had used datapump to export one of the Oracle schema of Source Database which will be used for workload analysis. This schema is used by one of the VB applications used on Source Database.

CONFIGURE EM DBCONSOLE

If Enterprise Manager Repository is created during the 11g installation, then we can start the dbconsole using the following command :

```
$ emctl start dbconsole
```

```
Oracle Enterprise Manager 11g Database Control Release 11.1.0.6.0
```

```
Copyright (c) 1996, 2007 Oracle Corporation. All rights reserved.  
https://db02pn:1158/em/console/aboutApplication
```

```
Starting Oracle Enterprise Manager 11g Database Control ..... started.  
-----
```

```
Logs are generated in directory  
/home/oracle/app/oracle/product/11.1.0/db_1/db02pn_orcl/sysman/log
```


CAPTURING THE PRODUCTION WORKLOAD

In order to capture production workload, we can use any of the following procedure

1. Using Enterprise Manager Database Console
2. Using PL/SQL API

USING ENTERPRISE MANAGER DATABASE CONSOLE

Step 1 : Invoke the Enterprise Manager Database Console

Using your browser, invoke Enterprise Manager Database Console by enter the following URL: <https://<hostname>:1158/em> and Log in as the **SYS** user with the SYSDBA password for your database

You can also find the URL using the following command

\$ emctl status dbconsole

Oracle Enterprise Manager 11g Database Control Release 11.1.0.6.0

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http://db02pn:1158/em/console/aboutApplication

Oracle Enterprise Manager 11g is running.

Logs are generated in directory

/home/oracle/app/oracle/product/11.1.0/db_1/db02pn_orcl/sysman/log

ORACLE Enterprise Manager 11g
Database Control

Login

Login to Database:orcl

* User Name

* Password

Connect As ▼

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Step 2 : Click on **Software and Support** Tab


ORACLE Enterprise Manager 11g Database Control

Database Instance: orcl

Home Performance Availability Server Schema Data Movement **Software and Support**

Latest Data Collected From Target Jul 19, 2007 1:28:47 PM EDT Refresh

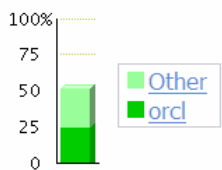
General Shutdown Black Out

 Status [Up](#)
Up Since **Jul 19, 2007 11:29:15 AM EDT**
Instance Name **orcl**
Version **11.1.0.6.0**
Host [db02pn](#)
Listener [LISTENER_db02pn](#)

[View All Properties](#)

Host CPU

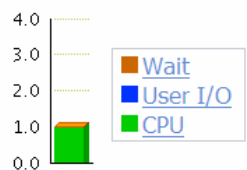
100%
75%
50%
25%
0



Load [0.70](#) Paging [0.00](#)

Active Sessions

4.0
3.0
2.0
1.0
0.0



Maximum CPU **4**

Step 3 : Click on Database Replay as shown below

ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout Database

Logged in As SYS

Database Instance: orcl

Home Performance Availability Server Schema Data Movement **Software and Support**

Software

- Configuration**
 - [Collection Status](#)
 - [Clone Oracle Home](#)
 - [Host Configuration](#)
 - [Oracle Home Inventory](#)
- Real Application Testing**
 - Database Replay**
 - [SQL Performance Analyzer](#)
- Database Software Patching**
 - [Patch Advisor](#)
 - [View Patch Cache](#)
 - [Patch Prerequisites](#)
 - [Stage Patch](#)
 - [Apply Patch](#)
- Deployment Procedure Manager**
 - [Getting Started with Deployment Procedure Manager](#)
 - [Deployment Procedures](#)
 - [Procedure Completion Status](#)
 - [Deployment and Provisioning Software Library](#)

Support

- [Support Workbench](#)

Related Links

Access	Advisor Central	Alert History
Alert Log Contents	All Metrics	Baseline Metric Thresholds
Blackouts	EM SQL History	Jobs
Metric and Policy Settings	Metric Collection Errors	Monitoring Configuration
Policy Groups	Reports	Scheduler Central
SQL Worksheet	Target Properties	User-Defined Metrics

Database | [Setup](#) | [Preferences](#) | [Help](#) | [Logout](#)

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Step 3 : For Capturing the Workload, Click on [Go to Task](#) against the Task Name [Capture Workload](#) as shown in RED below. This will start Capture Workload Wizard.

ORACLE Enterprise Manager 11g Database Control

Database Instance: orcl >

Database Replay

The Database Replay feature allows database workload to be captured on one system and replayed later on a different system. Replaying a captured workload can be useful to compare two different systems.

Task	Task Name	Description	Go to Task
1	Capture Workload	Choose this option to capture workload on this database.	
2	Preprocess Captured Workload	Preprocessing will prepare a captured workload for replay. This must be done once for every captured workload.	
3	Replay Workload	Choose this option to replay a preprocessed workload on this database.	

Step 4 : Capture Workload Wizard : Plan Environment

Click on [Acknowledge](#) check box for all Pre-requisite as shown in RED below. Make sure that you are following the prerequisites in your environment

Click **NEXT** to Continue

ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout Database

Plan Environment Options Parameters Schedule Review

Capture Workload: Plan Environment

Database **orcl** Cancel Step 1 of 5 Next
 Logged In As **SYS**

The following prerequisites should be met before proceeding to capturing the workload to avoid potential problems.

It is highly recommended to meet and acknowledge each of the following prerequisites.

Prerequisite	Acknowledge
Restarting the database prior to workload capture is recommended for the best workload replay result. Consider scheduling the workload capture at a time when the database can be restarted.	<input checked="" type="checkbox"/>
Make sure there is enough disk space to hold the captured workload. Consider doing a short duration workload capture and use it for estimating disk space requirement of a full workload capture.	<input checked="" type="checkbox"/>
Make sure you can restore the replay database to match the capture database at the start of the workload capture. A successful workload replay depends on application transactions accessing application data identical to that on a capture system. Common ways to restore application data state include point-in-time recovery, flashback, and import/export.	<input checked="" type="checkbox"/>

Cancel Step 1 of 5 Next

Database | Setup | Preferences | Help | Logout

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Step 5 : Capture Workload Wizard : Options .

There are three options namely :

1. Restarting the database → I will use Do not Restart the Database as shown below
2. Defining the Workload filters → Allows you to define user session that should be captured. I will use the Default setting for my test case.

Click **NEXT** to Continue

ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout Database

Plan Environment **Options** Parameters Schedule Review

Capture Workload: Options

Database **orcl** Cancel Back Step 2 of 5 Next
Logged In As **SYS**

Database Restart Options

A database restart prior to a workload capture is normally required to ensure a complete and accurate capture.

TIP Not restarting could result in in-flight transactions being captured, which may adversely affect the replay of subsequent captured transactions.

Restart the database prior to the capture. (Recommended)

Do not restart the database prior to the capture.

Workload Filters

Workload filters are used to customize what workload will be captured. By default, most external client requests made to the database are captured. Refer to system documentation for more information.

Filter Mode Exclusion

Excluded Sessions

All sessions will be captured except for those listed below.

Filter Name	Type	Session Attribute	Value	Remove
Oracle Management Service (DEFAULT)	Excluded	Program	OMS	
Oracle Management Agent (DEFAULT)	Excluded	Program	emagent%	

Add Another Row

TIP You may use % for wildcard in a filter value.

Cancel Back Step 2 of 5 **Next**

Database | Setup | Preferences | Help | Logout

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Step 6 : Capture Workload Wizard : Parameters

There are two database parameters namely

1. Workload Capture parameter → To define Workload capture directory
2. Database Shutdown Parameter → Will appear only if you have select "Restart Database" in OPTIONS screen previously. Here you can specify if database can be brought down using Immediate/Transactional/Abort option. As I had used "Do not restart database" and so this parameter will not be visible in below screen.

In order to store the Workload capture files, you need to define a directory in Operating system and then link it to Oracle Database directory. Click on **Create Directory Object** as shown in RED below or select it from already available database directories.

Click **NEXT** to Continue

ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout Database

Plan Environment Options **Parameters** Schedule Review

Capture Workload: Parameters

Database **orcl** (Cancel) (Back) Step 3 of 5 (Next)
Logged In As **SYS**

Workload Capture Parameters

* Capture Name

* Directory Object (Create Directory Object)

Select a directory object to hold the captured workload.
The selected directory object cannot already contain a captured workload

(Cancel) (Back) Step 3 of 5 (Next)

Database | Setup | Preferences | Help | Logout

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Step 7 : Capture Workload Wizard – Parameters → Create Directory Objects

Create operating system directory on the Database server which will be used to hold the capture process files and make sure that it has sufficient space based on your workload.

```
[oracle@db02pn ~]$ mkdir -p /home/oracle/capture_dir
```

Specify the **Name** to the Directory created in Database and give the **Path** created above on the Operating system. Click on **Test File System** to make sure that directory is available on the database server.



Step 8 : Capture Workload Wizard – Parameters → Create Directory Objects
Specify Database Server **Username** and **Password** and Click **Login** to continue

ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout Database

Logged in As SYS

Host Login

Host Name **db02pn**

Oracle Home **/home/oracle/app/oracle/product/11.1.0/db_1**

* Username

* Password

Save as Preferred Credential

Cancel Login

Cancel Login

Database | Setup | Preferences | Help | Logout

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Step 9 : Capture Workload Wizard – Parameters → Create Directory Objects
Click **Return** to go back to Create Directory Object screen

ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout Database

Database Instance: orcl > Directory Objects > Create Directory Object > Logged in As SYS

Confirmation

The directory **/home/oracle/capture_dir** exist

Return

Database | Setup | Preferences | Help | Logout

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Step 10 : Capture Workload Wizard – Parameters → Create Directory Objects
You are back to Create Directory Objects screen and click **OK** to continue

If you will click on **SHOW SQL**, it will show you're the SQL been used to create the specified directory as shown below

```
CREATE DIRECTORY "captdir" AS '/home/oracle/capture_dir'
```



Step 11 : Capture Workload Wizard – Parameters → Create Directory Objects

You will get the message 'Directory object created successfully'. Click **Next** to continue with the Capture Wizard

ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout Database

Plan Environment Options **Parameters** Schedule Review

Confirmation
Directory object created successfully.

Capture Workload: Parameters

Database **orcl** Cancel Back Step 3 of 5 Next
Logged In As **SYS**

Workload Capture Parameters

* Capture Name CAPTURE-orcl-20070719133228

* Directory Object captdir Create Directory Object

Select a directory object to hold the captured workload.
The selected directory object cannot already contain a captured workload.

Cancel Back Step 3 of 5 **Next**

Database | Setup | Preferences | Help | Logout

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Step 12 : Capture Workload Wizard – Schedule

Accept the Default Job Name and can specify the meaningful **Description** to the Job

Specify the Database Server **Host Credential** where the Workload file will be stored

Specify the **Database Credential** that will be used to connect to the database to collect the workload statistics

Click **Next** to Continue

ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout Database

Plan Environment Options Parameters **Schedule** Review

Capture Workload: Schedule

Database **orcl** Logged In As **SYS** [Cancel] [Back] Step 4 of 5 [Next]

Job Parameters

* Job Name CAPTURE-ORCL-20070719133228

Description Job to Capture Load for DB Replay

Job Schedule

Choose a start time and a capture duration so that the workload you are interested in replaying at a later time can be captured.

Start **Capture Duration**

Immediately Not Specified
 Later Capture must be stopped manually if an end is not specified

Date Jul-19-2007 (example: Dec-12-2002) Hours 0 Minutes 0

Time 1:30:00 AM/PM AM PM

Job Credentials

Host Credentials **Database Credentials**

* Username oracle * Username sys

* Password ***** * Password *****

* Confirm Password ***** * Confirm Password *****

Save as Preferred Credential Save as Preferred Credential

Connect As SYSDBA

You need to login as SYSDBA or SYSOPER in order to capture workload.

[Cancel] [Back] Step 4 of 5 [Next]

Database | Setup | Preferences | Help | Logout

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Step 13 : Capture Workload Wizard – Review

You can now review the specified information in the Capture Workload Wizard and click **SUBMIT** to start the Capture process

ORACLE Enterprise Manager 11g Database Control [Setup](#) [Preferences](#) [Help](#) [Logout](#)

Plan Environment Options Parameters Schedule **Review**

Capture Workload: Review

Database **orcl** (Cancel) (Back) Step 5 of 5 (Submit)
 Logged In As **SYS**

Review the following settings for capturing the workload.

Job Name **CAPTURE-ORCL-20070719133228**
 Capture Name **CAPTURE-orcl-20070719133228**
 Directory Object **capt_dir**
 Start Time **Immediately**
 Capture Duration **Not Specified**

Database Restart

Restart Database **No**

Workload Filters: Excluded Sessions

Filter Name	Type	Session Attribute	Value
Oracle Management Service (DEFAULT)	Excluded	Program	OMS
Oracle Management Agent (DEFAULT)	Excluded	Program	emagent%

(Cancel) (Back) Step 5 of 5 (Submit)

[Database](#) | [Setup](#) | [Preferences](#) | [Help](#) | [Logout](#)

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Step 14 : Capture Process is Started as shown below

Status will show that Capture is **IN PROGRESS**

You can **Stop** the Capture anytime when you are done using **STOP CAPTURE** button

You can click on **REFRESH** button to monitor the progress of the Capture Process

The screenshot displays the Oracle Enterprise Manager 11g interface. At the top, it shows 'ORACLE Enterprise Manager 11g Database Control' and navigation links for 'Setup', 'Preferences', 'Help', and 'Logout'. The current page is 'Database Instance: orcl > Database Replay >'. A 'Confirmation' message states: 'The workload capture has started.' Below this, instructions are provided for replaying the workload on a different system, including exporting AWR data, restoring the replay database, making changes, copying the workload, and preprocessing the captured workload. A 'View Data' section shows 'Real Time: 60 Second Refresh'. The main heading is 'View Workload Capture: CAPTURE-orcl-20070719133228', with a 'Page Refreshed Jul 19, 2007 1:49:37 PM EDT' and a 'Refresh' button. The status is 'In Progress' with a 'Stop Capture' button. A 'Summary' section lists details: Name (CAPTURE-orcl-20070719133228), Directory Object (captdir), Database Name (ORCL), Capture Database Version (11.1.0.6.0), DBID (1155348838), Capture Error Code (None), and Capture Error Message (None). It also shows Captured Data Size (0.01 MB), Duration (00:00:21), Start Time (Jul 19, 2007 1:49:15 PM EDT), End Time (N/A), Start SCN (6771511559), and End SCN (N/A). Below the summary are tabs for 'Workload Profile' and 'Workload Filters', and a 'View Workload Capture Report' button. The 'Average Active Sessions' section is currently empty. The 'Comparison' table shows:

	Total	Capture	Percentage of Total
Database Time (hh:mm:ss)	00:00:01	00:00:00	N/A
Average Active Sessions	0.07	0.00	N/A
User Calls	36	14	38.89

Step 15 : Click on **REFRESH** to see the progress in the **COMPARISON** as well as **Average Active Session** boxes as shown below. You can also view the **Workload Capture Report** from this window

ORACLE Enterprise Manager 11g Database Control

Database Instance: orcl > Database Replay >

View Data Real Time: 60 Second Refresh

View Workload Capture: CAPTURE-orcl-20070719133228

Page Refreshed Jul 19, 2007 2:02:58 PM EDT

Status **In Progress** [Stop Capture](#)

Summary

Name	CAPTURE-orcl-20070719133228	Captured Data Size (MB)	0.02
Directory Object	captdir	Duration (hh:mm:ss)	00:13:42
Database Name	ORCL	Start Time	Jul 19, 2007 1:49:15 PM EDT
Capture Database Version	11.1.0.6.0	End Time	N/A
DBID	1155348838	Start SCN	6771511559
Capture Error Code	None	End SCN	N/A
Capture Error Message	None		

Workload Profile [Workload Filters](#)

[View Workload Capture Report](#)

Average Active Sessions

Comparison

	Total	Capture Percentage of Total
Database Time (hh:mm:ss)	00:00:06	00:00:00 N/A
Average Active Sessions	0.01	0.00 N/A
User Calls	3,788	103 2.72
Transactions	393	29 7.38
Connects	43	21 48.84
Application Errors	N/A	0 N/A

TIP Some statistics are collected every 60 seconds.

Workload Profile [Workload Filters](#)

Step 16: Workload Capture Report Sample

Oracle Enterprise Manager (SYS) - Workload Report - Windows Internet Explorer

Database Capture Report For ORCL

DB Name	DB Id	Release	RAC	Capture Name	Status
ORCL	1155348838	11.1.0.6.0	NO	CAPTURE-orcl-20070719133228	IN PROGRESS

Information	Capture
Start time:	19-Jul-07 13:49:15 (SCN = 6771511559)
End time:	(SCN =)
Duration:	second
Capture size:	26.94 KB
Directory object:	captdir
Directory path:	/home/oracle/capture_dir
Directory shared in RAC:	FALSE
Filters used:	2

DB Capture Report

- [Capture Statistics](#)
- [Workload Filters](#)

[Back to Top](#)

Captured Workload Statistics

- 'Value' represents the corresponding statistic aggregated across the entire captured database workload.
- '% Total' is the percentage of 'Value' over the corresponding system-wide aggregated total.

Statistic Name	Value	% Total
DB time (secs)	0.36	5.71
Average Active Sessions		
User calls captured	110	2.34
User calls captured with Errors	0	
Session logins	22	42.31
Transactions	33	6.79

[Back to Top](#)

Workload Filters

#	Filter Name	Attribute	Value
1	ORACLE MANAGEMENT AGENT (DEFAULT)	PROGRAM	emagent%
2	ORACLE MANAGEMENT SERVICE (DEFAULT)	PROGRAM	OMS

Step 17 : Stop the Capture Process

When you are done with collecting all Workload data, click on **Stop Capture** to stop the Capture Process

View Data

View Workload Capture: CAPTURE-orcl-20070719133228

Page Refreshed Jul 19, 2007 1:49:37 PM EDT

Status **In Progress**

Summary

Name	CAPTURE-orcl-20070719133228	Captured Data Size (MB)	0.01
Directory Object	captdir	Duration (hh:mm:ss)	00:00:21
Database Name	ORCL	Start Time	Jul 19, 2007 1:49:15 PM EDT
Capture Database Version	11.1.0.6.0	End Time	N/A
DBID	1155348838	Start SCN	6771511559
Capture Error Code	None	End SCN	N/A
Capture Error Message	None		

Average Active Sessions

Step 18 : Click YES to stop the Capture Process

ORACLE Enterprise Manager 11g Database Control [Setup](#) [Preferences](#) [Help](#) [Logout](#) **Database**

Confirmation

Are you sure you want to stop the current capture?

[Database](#) | [Setup](#) | [Preferences](#) | [Help](#) | [Logout](#)

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Step 19 : Click YES to Dump the AWR data to the Workload Capture Directory which will used for Analysis in later steps. This will submit a job to Database scheduler.

The screenshot shows the Oracle Enterprise Manager 11g Database Control interface. At the top left, it says "ORACLE Enterprise Manager 11g Database Control". At the top right, there are links for "Setup", "Preferences", "Help", and "Logout", and a "Database" tab. The main heading is "Export AWR Data". The text asks: "Do you want to export the relevant AWR (Automatic Workload Repository) data to the workload directory now? Exporting the AWR data from this database enables in-depth capture and replay analysis. A database scheduler job will be created to perform the export immediately." Below this is a tip: "TIP If you choose not to export the AWR data now, you may perform the export at a later time from the page that lists the capture history on this database". At the bottom right, there are two buttons: "No" and "Yes". The "Yes" button is highlighted with a red box. At the bottom left, there is a copyright notice: "Copyright © 1996, 2007, Oracle. All rights reserved. Oracle, JD Edwards, PeopleSoft, and Retek are registered trademarks of Oracle Corporation and/or its affiliates. Other names may be trademarks of the About Oracle Enterprise Manager".

Step 20 : View Job to see if the AWR export Job is completed which can take few minutes. This page will also display as what is the Start time and End time of Capture which will be used later on during the database replay.

ORACLE Enterprise Manager 11g Database Control
Setup Preferences Help Logout

Database

Database Instance: orcl > Database Replay >
Logged in As SYS

Confirmation
 Job 'EXPORT-AWR-20070719141957' to export the AWR data has been submitted to the database scheduler.
[View Job](#)

View Workload Capture: CAPTURE-orcl-20070719133228

Status **Completed**

Summary

Name	CAPTURE-orcl-20070719133228	Captured Data Size (MB)	0.03
Directory Object	captdir	Duration (hh:mm:ss)	00:25:51
Database Name	ORCL	Start Time	Jul 19, 2007 1:49:15 PM EDT
Capture Database Version	11.1.0.6.0	End Time	Jul 19, 2007 2:15:06 PM EDT
DBID	1155348838	Start SCN	6771511559
Capture Error Code	None	End SCN	6771515021
Capture Error Message	None		

Workload Profile
[Workload Filters](#)

Average Active Sessions

Comparison

	Total	Capture	Percentage of Total
Database Time (hh:mm:ss)	00:00:46	00:00:00	N/A
Average Active Sessions	0.03	0.00	N/A
User Calls	8,293	132	1.59
Transactions	724	44	6.08
Connects	82	25	30.49
Application Errors	N/A	0	N/A

Step 21 : Checking the Status of Job submitted for AWR export. Click OK to go back to Database Home Page

ORACLE Enterprise Manager 11g Database Control [Setup](#) [Preferences](#) [Help](#) [Logout](#) **Database**

Database Instance: orcl > Scheduler Jobs > Logged in As SYS

View Job: SYS.EXPORT-AWR-20070719141957

General

Name **EXPORT-AWR-20070719141957**
Schema [SYS](#)

Command

Operation Detail

Select	Log ID	Log Date	Operation	Status
<input type="radio"/>	881	Jul 19, 2007 2:21:11 PM -04:00	RUN	SUCCEEDED

Database | [Setup](#) | [Preferences](#) | [Help](#) | [Logout](#)

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Step 22 : Check the files generated by Capture process on Database server**Go to Directory created in Step 7 and verify if it contains the workload repository files**

```

172.30. - F-Secure SSH - [Defaults.ssh]
File Edit View Tools Help
[oracle@capture_dir]$ ls -ltr
total 13492
-rw-r----- 1 oracle oinstall      0 Jul 19 13:49 wcr_rec_00001.start
-rw-r----- 1 oracle oinstall  1348 Jul 19 13:49 wcr_4d7x440002mup.rec
-rw-r----- 1 oracle oinstall   928 Jul 19 13:49 wcr_4d7x440002jx0.rec
-rw-r----- 1 oracle oinstall  1140 Jul 19 13:49 wcr_4d7x444002mqs.rec
-rw-r----- 1 oracle oinstall   928 Jul 19 13:49 wcr_4d7x448002jy8.rec
-rw-r----- 1 oracle oinstall  1127 Jul 19 13:49 wcr_4d7x448002k49.rec
-rw-r----- 1 oracle oinstall  1128 Jul 19 13:49 wcr_4d7x444h002k2m.rec
-rw-r----- 1 oracle oinstall  1126 Jul 19 13:49 wcr_4d7x45s002k84.rec
-rw-r----- 1 oracle oinstall   913 Jul 19 13:49 wcr_4d7x460002ksw.rec
-rw-r----- 1 oracle oinstall  1128 Jul 19 13:49 wcr_4d7x460002kma.rec
-rw-r----- 1 oracle oinstall  1124 Jul 19 13:49 wcr_4d7x460002km8.rec
-rw-r----- 1 oracle oinstall  1128 Jul 19 13:49 wcr_4d7x46n002k4c.rec
-rw-r----- 1 oracle oinstall  1140 Jul 19 13:49 wcr_4d7x46w002k4g.rec
-rw-r----- 1 oracle oinstall  2604 Jul 19 13:50 wcr_4d7x49n002mxxp.rec
-rw-r----- 1 oracle oinstall  2402 Jul 19 13:50 wcr_4d7x49s002mxt.rec
-rw-r----- 1 oracle oinstall  1128 Jul 19 13:50 wcr_4d7x4ah002k9p.rec
-rw-r----- 1 oracle oinstall  1128 Jul 19 13:50 wcr_4d7x4ah002k47.rec
-rw-r----- 1 oracle oinstall  1835 Jul 19 13:53 wcr_4d7x54c002n60.rec
-rw-r----- 1 oracle oinstall  2501 Jul 19 13:58 wcr_4d7x65h002nb7.rec
-rw-r----- 1 oracle oinstall  2925 Jul 19 13:58 wcr_4d7x65h002nba.rec
-rw-r----- 1 oracle oinstall  1836 Jul 19 13:58 wcr_4d7x69s002nd3.rec
-rw-r----- 1 oracle oinstall  1751 Jul 19 13:58 wcr_4d7x6an002nf9.rec
-rw-r----- 1 oracle oinstall  1833 Jul 19 14:03 wcr_4d7x7gc002np1.rec
-rw-r----- 1 oracle oinstall  1836 Jul 19 14:08 wcr_4d7x8ns002nz.z.rec
-rw-r----- 1 oracle oinstall  1836 Jul 19 14:13 wcr_4d7x9u8002p6x.rec
-rw-r----- 1 oracle oinstall  1751 Jul 19 14:13 wcr_4d7x9v4002p83.rec
-rw-r----- 1 oracle oinstall  4120 Jul 19 14:15 wcr_cr.text
-rw-r----- 1 oracle oinstall 12172 Jul 19 14:15 wcr_cr.html
-rw-r----- 1 oracle oinstall   400 Jul 19 14:15 wcr_capture.wmd
-rw-r----- 1 oracle oinstall  24723 Jul 19 14:21 wcr_ca.log
-rw-r----- 1 oracle oinstall 13639680 Jul 19 14:21 wcr_ca.dmp

```

CAPTURE WORKLOAD USING APIs

STARTING A WORKLOAD CAPTURE

```
[db02pn]$ mkdir /home/oracle/api_dir
```

```
SQL> create directory api_dir as '/home/oracle/api_dir';
```

Directory created.

```
SQL> BEGIN
2 DBMS_WORKLOAD_CAPTURE.START_CAPTURE (name => 'capture07',
3 dir => 'API_DIR',
4 NO_RESTART_MODE => TRUE);
5 END;
6 /
```

PL/SQL procedure successfully completed.

1. If NO_RESTART_MODE is FALSE (by Default), then it means that Capture can only start if we are in RESTRICTED SESSION mode. If it is not specified as TRUE, then you will get an error **ORA-15504**: cannot start workload capture because instance 1 not present in RESTRICTED SESSION mode
2. If you have used DIR specified Directory earlier for CAPTURING, then you will get an error **ORA-15505**: cannot start workload capture because instance 1 encountered errors while accessing directory "/home/oracle/capture_dir"
3. So either you have to create new Directory or you have to delete the Capture entries from the OS directory. You may be required to delete some entires from **DBA_WORKLOAD_CAPTURES** using **dbms_workload_capture.delete_capture_info** procedure

```
SQL> select name, directory, status, start_time,
end_time, duration_secs, dir_path
from dba_workload_captures
```

NAME	DIRECTORY	STATUS	START_TIME	END_TIME	DURATION	DIR_PATH
capture07	API_DIR	IN PROGRESS	26-JUL-07			/home/oracle/api_dir

You will see the END_TIME is null as Capture is still running as shown by STATUS column

STOPPING A WORKLOAD CAPTURE

```
SQL> BEGIN
  2 DBMS_WORKLOAD_CAPTURE.FINISH_CAPTURE ();
  3 END;
  4 /
```

PL/SQL procedure successfully completed

```
SQL> select name,      directory,      status, start_time,
           end_time,    duration_secs,    dir_path
        from dba_workload_captures
```

NAME	DIRECTORY	STATUS	START_TIME	END_TIME	DURATION	DIR_PATH
capture07	API_DIR	COMPLETED	26-JUL-07	26-JUL-07	6913	/home/oracle/api_dir