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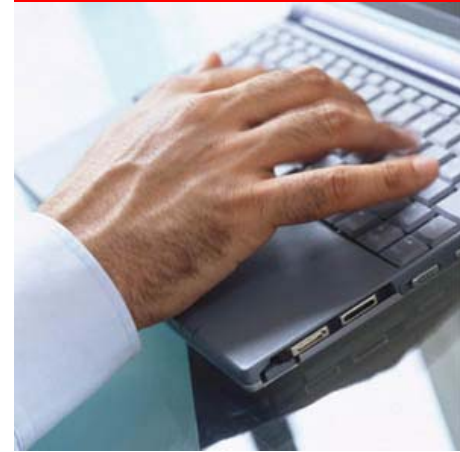
Oracle Streams Replication Made Easy

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Oracle Streams

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Principal Member Technical Staff
Maximum Availability Architecture (MAA)

Agenda

- Oracle Streams Overview
- Streams and Grid Control

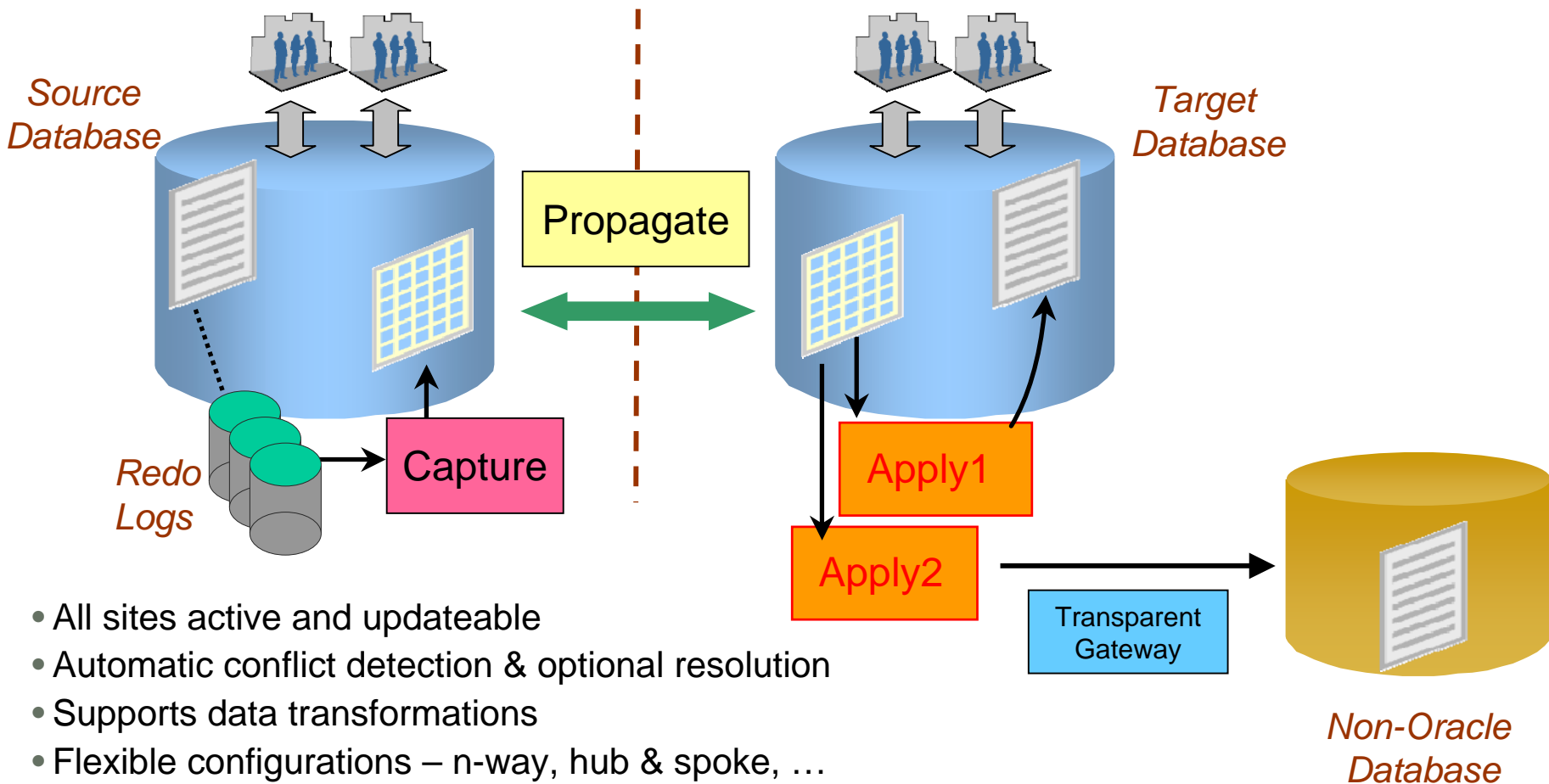


Oracle Streams

- Simple solution for information sharing
- Provides
 - Uniquely flexible information sharing
 - Active/Active replication
 - Real-time ETL for data warehouses
 - Availability during database migration
 - Availability during application upgrade
 - Message queuing
 - Event management and notification

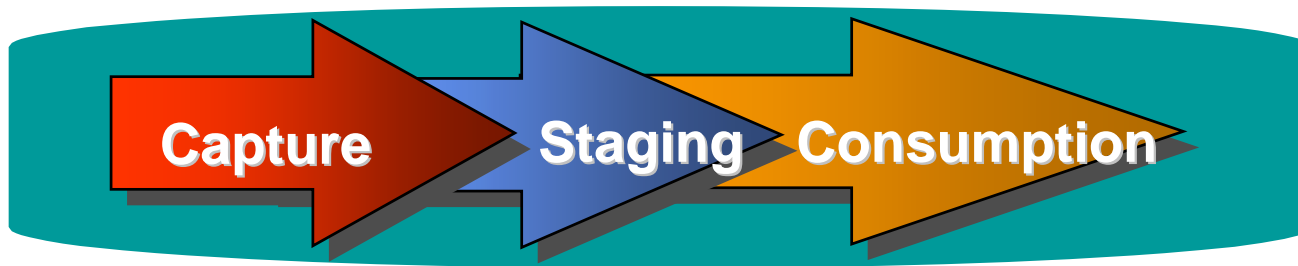
Oracle Streams

Powerful Logical Database Replication Solution



- All sites active and updateable
- Automatic conflict detection & optional resolution
- Supports data transformations
- Flexible configurations – n-way, hub & spoke, ...
- Database platform / release / schema structure can differ
- Provides HA for custom apps where update conflicts can be avoided or managed

Streams Functional Components



- Asynchronous Information Sharing
 - Capture messages at a database
 - Store messages in a queue
 - Propagate messages across databases
 - Apply messages at local or remote databases
- Integrated feature of the database
- Flexibility to meet business requirements beyond replication

Grid Control 10.2.0.5

Simplified Management, Fine-Grained Monitoring

- Wizards to configure replication
- Monitor Streams components by database or by path
 - Database: Streams components on specific database
 - Path: Streams components in path from source to target (across databases)
- Streams metrics for EM alerts notification
 - Default thresholds for Latency, Process Status, or Errors
 - Additional metrics(threshold) available for alerting.
- Automated Workflows for common Streams/DBA actions

Streams Replication Wizard

Database Instance: STREAMS2.us.oracle.com

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Move Row Data

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Move Database Files

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Streams

Setup
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Advanced Replication

[Setup](#)
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Streams

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Oracle recommends that, prior to performing Streams Replication on databases in your configuration, you create a [Streams Administrator user](#)

Setup Streams Replication

- Replicate Whole Database
Setup replication for whole database
- Replicate Schemas
Setup replication for selected schemas by excluding tables
- Replicate Tablespaces
Setup replication for a selected set of table spaces
- Replicate Tables
Setup replication for selected tables and specifying the rules

Setup Downstream Capture

Create downstream capture processes that can be used in replication by other databases

Create Advanced Queue

Create Advanced Queues that can be used by replication processes or any other processes

Host Credentials

Operating System login credentials of the machine that runs the selected database

* Username
* Password

Save as Preferred Credential

Overview

- Using the Streams Replication Setup wizard you can setup the streams replication between two databases.
- Replication can be setup for the Whole Database, selected table spaces, schemas or tables.
- It is possible to specify objects to exclude from replication.
- Downstream capture setup wizard helps setup the capture and propagation processes on a different database from that of source database. These processes can be used in subsequent replication setup operations.
- It is possible to review and edit replication setup scripts for further customization if necessary prior to submitting the operation.
- Advanced queue setup wizard helps create new queues.
- Operations can be submitted immediately or scheduled for later execution.

Streams Replication Wizard

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Grid Control

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Setup Streams Replication: Replication Options

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Directory Path

Specify existing directories or directory objects to be used for datapump export and import. They will be used to move data between source and destination databases during initial setup. If directories option is selected, Enterprise Manager will create temporary directory objects that will be deleted after replication is setup.

Specify Directory objects

✦ Source Database

✦ Destination Database

Advanced Options

Options

Capture, Propagate and Apply data manipulation language (DML) changes

This option is used in only table rule setup

Capture, Propagate and Apply data definition language (DDL) changes

Select to configure an Oracle Streams replication environment that maintains both DML and DDL changes.

Setup Bi-directional replication

If selected then a capture and apply process is configured at both source and destination databases

Processes

Capture Process

Local Capture

Select this option to create/use the capture processes on the current database

Downstream Capture

Select this option to use the capture processes running on other database

✦ Downstream Database

Select name of the downstream database from which you want to use the capture process

Streams Administrator

Password

Monitoring with Grid Control

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Data Movement

Software and Support

Page Refreshed Oct 6, 2009 1:49:56 PM PDT

Refresh

View Data

Automatically (60 sec)

General



Shutdown Black Out

Status Up

Up Since Oct 5, 2009 2:39:16 PM PDT

Instance Name STRMSB1

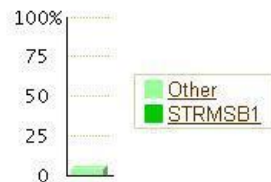
Version 11.1.0.7.0

Host halinux13.us.oracle.com

Listener

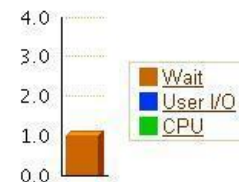
View All Properties

Host CPU



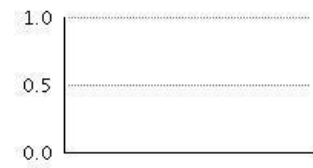
Load 0.30 Paging 0.00

Active Sessions



Core Count 4

SQL Response Time



Latest collection is empty.

SQL Response Time (%) Unavailable

Edit Reference Collection

Diagnostic Summary

ADDM Findings 0
Alert Log No ORA- errors
Active Incidents 0

Space Summary

Database Size (GB) 124.731
Problem Tablespaces 0
Segment Advisor Recommendations 2
Dump Area Used (%) 91

High Availability

Console Details
Instance Recovery Time (sec) 30
Last Backup n/a
Problem Archive Areas 0
Flashback Database Logging Disabled
Streams Components x 1 ✓ 1

Alerts

Category All Go Critical x 1 Warning ! 2

Severity	Category	Name	User Impact	Message	Alert Triggered
x	Streams Processes Status	Streams Process Status		Status for Streams process APPLY\$_STREAMS1_287 is ABORTED.	Oct 6, 2009 1:22:34 PM
!	Streams Processes Status	Streams Process Errors		Streams component APPLY\$_STREAMS1_287 has 1 errors.	Oct 6, 2009 1:22:34 PM
!	Waits by Wait Class	Database Time Spent Waiting (%)		Metrics "Database Time Spent Waiting (%)" is at 100 for event class "Network"	Oct 6, 2009 1:09:14 PM

Streams Metrics









Metric and Policy Settings

[Cancel](#) [OK](#)

Metric Thresholds

[Policies](#)

View ▾

Metric	Comparison Operator	Warning Threshold	Critical Threshold	Corrective Actions	Collection Schedule	Edit
Streams Apply - (%) Messages in Waiting State	>	<input type="text" value="75"/>	<input type="text" value="90"/>	None	Every 5 Minutes	
Streams Apply - (%) Spilled Messages	>	<input type="text" value="60"/>	<input type="text" value="80"/>	None	Every 5 Minutes	
Streams Capture - (%) Spilled Messages	>	<input type="text" value="60"/>	<input type="text" value="80"/>	None	Every 5 Minutes	
Streams - Latency (seconds)	>	<input type="text"/>	<input type="text"/>	None	Every 5 Minutes	
Streams Process Errors	>	<input type="text" value="0"/>	<input type="text"/>	None	Every 5 Minutes	
Streams Process Status	=	<input type="text" value="DISABLI"/>	<input type="text" value="ABORTE"/>	None	Every 5 Minutes	
Streams Prop - (%) Messages in Waiting State	>	<input type="text" value="75"/>	<input type="text" value="90"/>	None	Every 5 Minutes	
Streams - Throughput (messages/sec)	<	<input type="text"/>	<input type="text"/>	None	Every 5 Minutes	

Available Streams Metrics

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All Metrics

Collected From Target **Oct 10, 2009 11:11:57 PM PDT** 

[Expand All](#) | [Collapse All](#)

Metrics	Thresholds	Collection Schedule	Upload Interval	Last Upload
▼ STREAMS1.us.oracle.com				
▶ Streams Apply Coordinator Statistics	Not Applicable	Every 5 Minutes	Every Collection	-
▶ Streams Apply Errors	Not Applicable	Every 5 Minutes	Every Collection	-
▶ Streams Apply Queue - Buffered	All	Every 5 Minutes	Every Collection	-
▶ Streams Apply Queue - Persistent	All	Every 5 Minutes	Every Collection	Oct 10, 2009 11:17:49 PM PDT
▶ Streams Apply Reader Statistics	None	Every 5 Minutes	Every Collection	-
▶ Streams Capture Message Statistics	Not Applicable	Every 5 Minutes	Every Collection	Oct 10, 2009 11:16:57 PM PDT
▶ Streams Capture Queue Statistics	All	Every 5 Minutes	Every Collection	Oct 10, 2009 11:16:57 PM PDT
▶ Streams Latency and Throughput	None	Every 5 Minutes	Every Collection	Oct 10, 2009 11:16:57 PM PDT
▶ Streams Pool Usage	Not Applicable	Real-time Only	n/a	n/a
▶ Streams Processes Count	Not Applicable	Every 5 Minutes	Every Collection	Oct 10, 2009 11:17:49 PM PDT
▶ Streams Processes Status	All	Every 5 Minutes	Every Collection	Oct 10, 2009 11:16:57 PM PDT
▶ Streams Propagation - Queue Propagation	Not Applicable	Every 5 Minutes	Every Collection	Oct 10, 2009 11:16:57 PM PDT
▶ Streams Propagation - Message State Stats	All	Every 5 Minutes	Every Collection	Oct 10, 2009 11:17:49 PM PDT

Expanded Metrics

All Metrics

Collected From Target Oct 10, 2009 11:11:57 PM PDT 

Expand All | Collapse All

Metrics	Thresholds	Collection Schedule	Upload Interval	Last Upload
▼ STREAMS1.us.oracle.com				
▼ Streams Apply Coordinator Statistics	Not Applicable	Every 5 Minutes	Every Collection	-
Rate of Transactions Applied (per Sec)	Not Applicable			
Rate of Transactions Assigned (per Sec)	Not Applicable			
Rate of Transactions Received (per Sec)	Not Applicable			
Total Number of Transactions Assigned	Not Applicable			
Total Number of Transactions Received	Not Applicable			
Total number of Transactions applied	Not Applicable			
▶ Streams Apply Errors	Not Applicable	Every 5 Minutes	Every Collection	-
▶ Streams Apply Queue - Buffered	All	Every 5 Minutes	Every Collection	-
▶ Streams Apply Queue - Persistent	All	Every 5 Minutes	Every Collection	Oct 10, 2009 11:12:49 PM PDT
▶ Streams Apply Reader Statistics	None	Every 5 Minutes	Every Collection	-
▶ Streams Capture Message Statistics	Not Applicable	Every 5 Minutes	Every Collection	Oct 10, 2009 11:11:57 PM PDT
▶ Streams Capture Queue Statistics	All	Every 5 Minutes	Every Collection	Oct 10, 2009 11:11:57 PM PDT
▶ Streams Latency and Throughput	None	Every 5 Minutes	Every Collection	Oct 10, 2009 11:11:57 PM PDT
▶ Streams Pool Usage	Not Applicable	Real-time Only	n/a	n/a
▶ Streams Processes Count	Not Applicable	Every 5 Minutes	Every Collection	Oct 10, 2009 11:12:49 PM PDT
▶ Streams Processes Status	All	Every 5 Minutes	Every Collection	Oct 10, 2009 11:11:57 PM PDT
▶ Streams Propagation - Queue Propagation	Not Applicable	Every 5 Minutes	Every Collection	Oct 10, 2009 11:11:57 PM PDT

Streams Overview

Streams

Overview **Streams** Topology

Last Refresh **October 10, 2009 12:10:02 AM PDT** Refresh View Data Real Time: 1 Minute Refresh

Streams Summary (Current Database)

Capture	n/a	Streams Pool Size(MB)	1024
Propagation	n/a	Streams Pool Size Used(%)	✓ 1
Apply	✓ 1		

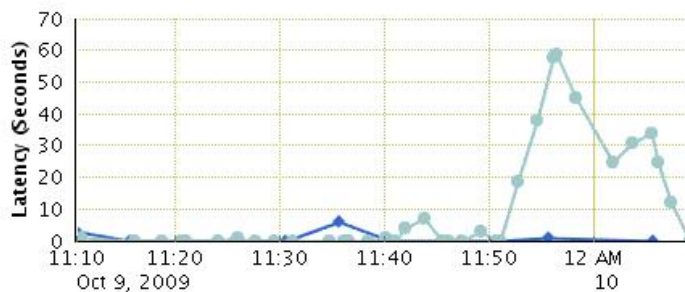
Streams Path Summary (Configuration Wide)

Total Streams Paths	3
Streams Paths Unavailable	1
Streams Paths with problems	1

Performance

View Path Level Show Data for Last 1 Hour

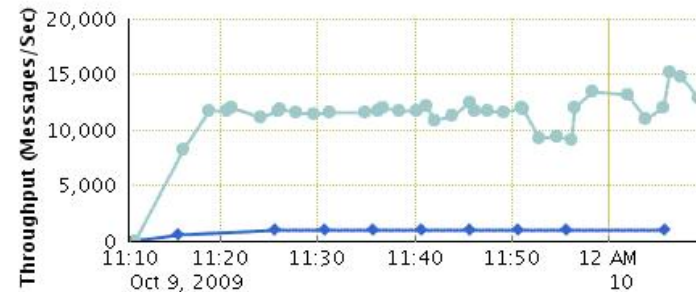
Path Level Latency



■ STR10LCY.US.ORACLE.COM=>STR10LCZ.US.ORACLE.COM:1
■ STREAMS1.US.ORACLE.COM=>STREAMS2.US.ORACLE.COM:3

⚠ Paths with no data in Last 1 Hour : 1

Path Level Throughput



■ STR10LCY.US.ORACLE.COM=>STR10LCZ.US.ORACLE.COM:1
■ STREAMS1.US.ORACLE.COM=>STREAMS2.US.ORACLE.COM:3

⚠ Paths with no data in Last 1 Hour : 1

Monitor Streams Activity by Path

11g Database

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Refreshing... Last Refresh **October 8, 2009 7:27:32 PM PDT** [Refresh](#) View Data Real Time: 1 Minute Refresh

View Component Level Path Level

Search

Action

[Expand All](#) | [Collapse All](#)

Select	Path/Component Name	Type	Status	State	Bottleneck	Latency (Seconds)	Throughput (Messages/Sec)	Component Database
<input type="radio"/>	Streams Path Summary (Configuration Wide)							
<input checked="" type="radio"/>	▶ STR10LCY.US.ORACLE.COM=>STR10LCZ.US		<input checked="" type="radio"/>			0	980.88	
<input type="radio"/>	▼ STREAMSA.US.ORACLE.COM=>STREAMSB.US		<input type="radio"/>			.1	46362.22	
<input type="radio"/>	CAPTURE_1		<input type="radio"/>	CAPTURING CHANGES		0	46353.51	STREAMSA.US.ORACLE.COM
<input type="radio"/>	"STREAMSADMIN"."OUTBOUND_Q"		<input type="radio"/>	Enqueue Enabled, Dequeue Enabled			46315.02	STREAMSA.US.ORACLE.COM
<input type="radio"/>	"STREAMSADMIN"."OUTBOUND_Q"=>"STREA		<input type="radio"/>	Waiting on empty queue		0	46261.89	STREAMSA.US.ORACLE.COM
<input type="radio"/>	"STREAMSADMIN"."OUTBOUND_Q"@STREAMS		<input type="radio"/>	Waiting for message from propagation sender				STREAMSB.US.ORACLE.COM
<input type="radio"/>	"STREAMSADMIN"."INBOUND_Q"		<input type="radio"/>	Enqueue Enabled, Dequeue Enabled			46233.55	STREAMSB.US.ORACLE.COM
<input type="radio"/>	APPLY_1		<input type="radio"/>	DEQUEUE MESSAGES		.1	46362.22	STREAMSB.US.ORACLE.COM
<input type="radio"/>	▼ STREAMS1.US.ORACLE.COM=>STREAMS2.US		<input type="radio"/>			0	11760.18	
<input type="radio"/>	LCAPTURE_11GR1		<input type="radio"/>	CAPTURING CHANGES		0	12062.27	STREAMS1.US.ORACLE.COM
<input type="radio"/>	"STREAMSADMIN"."STREAMS_Q"		<input type="radio"/>	Enqueue Enabled, Dequeue Enabled			12030.91	STREAMS1.US.ORACLE.COM
<input type="radio"/>	"STREAMSADMIN"."STREAMS_Q"=>"STREAM		<input type="radio"/>	Creating LCRs		0	12030.91	STREAMS1.US.ORACLE.COM
<input type="radio"/>	"STREAMSADMIN"."STREAMS_Q"@STREAMS1		<input type="radio"/>	Waiting for message from client				STREAMS2.US.ORACLE.COM
<input type="radio"/>	"STREAMSADMIN"."STREAMS_Q"		<input type="radio"/>	Enqueue Enabled, Dequeue Enabled			11757.67	STREAMS2.US.ORACLE.COM
<input type="radio"/>	LAPPLY_11GR1		<input type="radio"/>	EXECUTE TRANSACTION		0	11760.18	STREAMS2.US.ORACLE.COM

Action

Monitor Streams by Database

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Streams

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Streams

Topology

Last Refresh **October 8, 2009 7:42:43 PM PDT**

Refresh

View Data

Real Time: 1 Minute Refresh

View Component Level Path Level

Search All Go

Setup Propagation

Manage General Handlers

Action	Edit Parameters	Go					
Select	Name	Type	Status	State	Latency (Seconds)	Throughput (Messages/Sec)	Current Transactions Active/Spilled
<input checked="" type="radio"/>	LDCAPTURE_11GR1			CAPTURING CHANGES	0.0	11784.7	1 n/a
<input type="radio"/>	PROPAGATION_11GR1			ENABLED	0.0	11784.7	n/a n/a

Overview

Streams

Topology

1 active transaction for capture

Active Streams Transactions List (Running for more than 1 minute)

This table contains information about each transaction that is being currently processed by this component and is running longer than 1 minute. Click on View Details to navigate to the source database to see transaction details using LogMiner.

View Transaction Details

Select	Transaction ID	Session ID	Total Messages	Cumulative Messages	First SCN	Last SCN	Active Since	Active For (Seconds)
<input type="radio"/>	324.8.56101	1048	n/a	4	932298827	932529304	2009-10-08 262 19:39:19.0	

Automated Workflow

Create Source LogMiner Session

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LogMiner

[Cancel](#) [Continue](#)

Query Time Range

Time Range SCN Range

* Start SCN

* End SCN

TIP The oldest SCN available on disk is 783711814 [View Archived Logs](#)

TIP Earlier start times are available by [restoring archived logs](#)

Query Filter

View All Transactions View DDL Only

Table
Examples: Scott.Emp, Scott. %

DB User
Example: System

Advanced Query

Additional LogMiner Columns

Additional columns may be specified using a where clause (example: where MACHINE_NAME = 'myhost' AND DBMS_LOGMNR.MINE_VALUE(REDO_VALUE, 'SCOTT.DEPT.LOC') = 'BOSTON'). Click on the info icon for the column names.

[Cancel](#) [Continue](#)

Overview

LogMiner allows you to:

- Browse transactions by time or SCN range
- Query fastest by table name
- View results by transaction summary or record

LogMiner is fully integrated with Flashback
Transaction to:

- Show dependent transactions
- Undo a transaction along with dependent transactions

Automated Workflow

Redo Scanning

Cancel Stop

Processing: Mining Transactions

Enterprise Manager is mining transactions during the specified range using the following query filter:
where XIDUSN='324' and XIDSLT='8' and XIDSQN='56101'

Start SCN **932298827**
End SCN **932529304**



Transactions Found **1**
Approximate Time Remaining (secs) **0**
Redo Processed **0**
Total Redo **0**

TIP Click the Cancel button to cancel processing or the Stop button to stop mining and show the current results.

Cancel Stop

Automated Workflow

Review Source Transaction

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LogMiner Results

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Summary

Matching Transactions **1**
Matching Redo Records **5**

Query Filter **where XIDUSN='324' and XIDSLT='8' and XIDSQN='56101'**
Total Time **106 seconds**

The results show transactions containing redo records that matched the query filter. Transactions may contain other redo records. Click on a Transaction ID to view the all of the redo records in a transaction. The results can be filtered further by searching the sql redo.

Transaction Results

Search SQL Redo [Go](#)

View By [Transaction Summary](#) ▾

Transaction ID	DB User	Commit Timestamp [△]	Redo Records	Transaction Summary - Updates (upd), Inserts (ins), Deletes (del), Other (oth)
4401080025DB0000	SOEBIG		5	SOEBIG.ORDERS, SOEBIG.ORDER_ITEMS (4 ins, 1 oth)

TIP The transaction summary shows the first few tables modified by the transaction, along with the number of inserts, deletes and updates that matched the query filter.

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Automated Workflow

Review Source Transaction

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LogMiner Results

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Summary

Matching Transactions **1**

Matching Redo Records **5**

Query Filter **where XIDUSN='324' and XIDSLT='8' and XIDSQN='56101'**

Total Time **106 seconds**

The results show transactions containing redo records that matched the query filter. Transactions may contain other redo records. Click on a Transaction ID to view the all of the redo records in a transaction. The results can be filtered further by searching the sql redo.

Transaction Results

Search SQL Redo

[Go](#)

View By [Redo Record](#)

Transaction ID	SCN	Operation	Schema	Table	SQL Redo
4401080025DB0000	932298827	START			set transaction read write;
4401080025DB0000	932298827	INSERT	SOEBIG	ORDERS	insert into "SOEBIG"."ORDERS" values "ORDER_ID" = 96121850, "ORDER_DATE" = TO_TIMESTAMP_ITZ('08-OCT-09 07.39.19.877049 PM'), "ORDER_MODE" IS NULL, "CUSTOMER_ID" = 33407, "ORDER_STATUS" IS NULL, "ORDER_TOTAL" IS NULL, "SALES_REP_ID" IS NULL, "PROMOTION_ID" IS NULL;
4401080025DB0000	932460037	INSERT	SOEBIG	ORDER_ITEMS	insert into "SOEBIG"."ORDER_ITEMS" values "ORDER_ID" = 96043809, "LINE_ITEM_ID" = 0, "PRODUCT_ID" = 2091, "UNIT_PRICE" = 1, "QUANTITY" = 1;
4401080025DB0000	932469420	INSERT	SOEBIG	ORDER_ITEMS	insert into "SOEBIG"."ORDER_ITEMS" values "ORDER_ID" = 96043809, "LINE_ITEM_ID" = 1, "PRODUCT_ID" = 2144, "UNIT_PRICE" = 18, "QUANTITY" = 1;
4401080025DB0000	932529304	INSERT	SOEBIG	ORDER_ITEMS	insert into "SOEBIG"."ORDER_ITEMS" values "ORDER_ID" = 96043809, "LINE_ITEM_ID" = 2, "PRODUCT_ID" = 2336, "UNIT_PRICE" = 55, "QUANTITY" = 1;

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Manage Process Parameters

Example: Apply Parameters

Parameters

Restore Default Values

Name	Value	Set by user
PARALLELISM	4	YES
STARTUP_SECONDS	0	NO
TRACE_LEVEL	0	NO
TIME_LIMIT	INFINITE	NO
TRANSACTION_LIMIT	INFINITE	NO
MAXIMUM_SCN	INFINITE	NO
WRITE_ALERT_LOG	Y	NO
DISABLE_ON_LIMIT	N	NO
DISABLE_ON_ERROR	N	YES
COMMIT_SERIALIZATION	NONE	YES
ALLOW_DUPLICATE_ROWS	N	NO
TXN_LCR_SPILL_THRESHOLD	10000	NO
PRESERVE_ENCRYPTION	Y	NO
RTRIM_ON_IMPLICIT_CONVERSION	Y	NO

Managing Apply Errors

Automatic Conflict Detection

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 Hosts | Databases | Middleware | Web Applications | Services | Systems | Groups | **All Targets**
 Database Instance: STREAMS2.us.oracle.com > Streams > Logged in As STREAMSADMIN
Apply Errors: LAPPLY_11GR1
 Overview Streams **Topology**

Last Applied Message Number 935105417
 Last Message Apply Time 2009-10-08 23:04:48.0
 Create Time For Last Applied Message 2009-10-08 23:04:48.0

Common Error Messages Retry all Errors Delete All

Retry Error Delete Previous 1-25 of 135 Next 25

Select All | Select None

Select	Local Transaction ID	Message Number	Message Count	Commit SCN	Source Database	Error Number	Error Message	View Error LCRs
<input type="checkbox"/>	35.7.38597	1	1	935033486	STREAMS1.US.ORACLE.COM	26786	ORA-26786: A row with key ("IDX") = (1) exists but has conflicting column(s) "UPDATED" in table SOEBIG.HEARTBEAT ORA-01403: no data found	

ORACLE Enterprise Manager 10g Setup Preferences Help Logout
 Grid Control Home **Targets** Deployments Alerts Compliance Jobs Reports
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 Database Instance: STREAMS2.us.oracle.com > Streams > Apply Errors > View Error LCRs > Logged in As STREAMSADMIN
Compare Values: LAPPLY_11GR1

- Old Value shows the old column value in the row LCR. This is the column value for the row before the DML change.
- New Value shows the new column value in the row LCR. This is the column value for the row after the DML change.
- Current Value shows the column value in the row at the destination database. This is the row that will be modified by the row LCR when the apply process applies the change.

Column Name	Column Type	Old Value	New Value	Current Value
IDX	SYS.NUMBER	1	1	1
UPDATED	SYS.DATE	08-OCT-2009 10:57:53	08-OCT-2009 10:57:58	08-OCT-2009 23:07:20

Component Details

View Capture Details: LCAPTURE_11GR1

[Overview](#) [Streams](#) [Topology](#)

General

Name **LCAPTURE_11GR1**
 Queue **STREAMS_Q**
 Queue Schema **STREAMSADMIN**
 Status **ENABLED**
 Error Message
 Status Change Time **October 9, 2009 10:41:07 PM PDT**

Rules

Positive Rule Set [RULESET\\$_268](#)
 Positive Rule Set Owner **STREAMSADMIN**
 Negative Rule Set [n/a](#)
 Negative Rule Set Owner [n/a](#)

Database

Source Database **STREAMS1.US.ORACLE.COM**
 Source Database ID **2995332670**
 Capture Type **LOCAL**
 Use Database Link **NO**
 Logfile Assignment **IMPLICIT**
 LogMiner ID **163**
 Checkpoint Retention Time [60](#)

SCN

First SCN [948720971](#)
 Start SCN [948720971](#)
 Captured SCN **951839755**
 Applied SCN **951839605**
 Max Checkpoint SCN **951839755**
 Required Checkpoint SCN **951832706**

Objects

Search

This table lists all the objects captured by this process

Name	Rule Set Type	Change Type	Rule Name	Rule Type	Same Rule Condition
SOEBIG	POSITIVE	DDL	STREAMSADMIN.SOEBIG267	SCHEMA	YES
SOEBIG	POSITIVE	DML	STREAMSADMIN.SOEBIG266	SCHEMA	YES

 **TIP** Same Rule Condition indicates whether the ORIGINAL_RULE_CONDITION in the DBA_STREAMS_RULES view matches the current rule condition for the rule

Automatic Transformations

ORACLE Enterprise Manager 10g
Grid Control

Home Targets Deployments

Hosts | Databases | Middleware | Web Applications | Services | Systems | Groups |

Database Instance: STREAMS1.us.oracle.com > Streams > Manage Rule Set: RULESET\$ 233 >

Edit Rule

Cancel OK

Rule Name "STREAMSADMIN"."SOEBIG232"

Rule Condition
`((:ddl.get_object_owner() = 'SOEBIG' or
:ddl.get_base_table_owner() = 'SOEBIG') and
:ddl.get_source_database_name() =
'STREAMS1.US.ORACLE.COM')`

Associated Transformation

Custom Rule Based Transformation

Associate a PL/SQL function as a transformation for this rule

Declarative Rule Based Transformation

Add **Rename Schema** Go

Select Declarative Type	Step Number	Description
No items found		

TIP Changes will be applied to the database only on clicking 'OK' button

ORACLE Enterprise Manager 10g
Grid Control

Home Targets Deployments

Hosts | Databases | Middleware | Web Applications | Services | Systems | Groups |

Database Instance: STREAMS1.us.oracle.com > Logged in As STREAMSADMIN

Add Transformation: Rename Schema

Cancel OK

Rule Name **SOEBIG232**

From Schema Name

To Schema Name

Step Number

Specify the step number to override the default declarative transformation ordering

Monitor Streams Activity by Path

11g Database

ORACLE Enterprise Manager 10g Grid Control

Home Targets Deployments Alerts Compliance Jobs Reports

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Database Instance: STREAMS2.us.oracle.com > Logged in As STREAMSADMIN

Streams

Overview Streams Topology

Last Refresh: October 9, 2009 1:26:33 PM PDT Refresh View Data Real Time: 1 Minute Refresh

View Component Level Path Level

Search All Go

Action View Statistics

Expand All | Collapse All

Select Path/Component Name	Type	Status	State	Bottleneck	Latency (Seconds)	Throughput (Messages/Sec)	Component Database
Streams Path Summary (Configuration Wide)							
▶ STR10LCY.US.ORACLE.COM=>STR10LCZ.US					2	966.97	
▶ STREAMSA.US.ORACLE.COM=>STREAMSB.US					5.1	20376.55	
CAPTURE_1			CAPTURING CHANGES		5	20350.88	STREAMSA.US.ORACLE.C
"STREAMSADMIN"."OUTBOUND_Q"			Enqueue Enabled, Dequeue Enabled			20321.88	STREAMSA.US.ORACLE.C
"STREAMSADMIN"."OUTBOUND_Q"=>"STREA			Waiting on empty queue		0	20328.88	STREAMSA.US.ORACLE.C
"STREAMSADMIN"."OUTBOUND_Q"@STREAMS			Waiting for message from propagation sender				STREAMSB.US.ORACLE.C
"STREAMSADMIN"."INBOUND_Q"			Enqueue Enabled, Dequeue Enabled			20326.29	STREAMSB.US.ORACLE.C
APPLY_1			DEQUEUE MESSAGES		5.1	20376.55	STREAMSB.US.ORACLE.C
▶ STREAMS1.US.ORACLE.COM=>STREAMS2.US					758	5588.69	
LCAPTURE_11GR1			PAUSED FOR FLOW CONTROL		755	5577.28	STREAMS1.US.ORACLE.C
"STREAMSADMIN"."STREAMS_Q"			Enqueue Enabled, Dequeue Enabled			5564.91	STREAMS1.US.ORACLE.C
"STREAMSADMIN"."STREAMS_Q"=>"STREAM			Pausing for flow control		757	5565.03	STREAMS1.US.ORACLE.C
"STREAMSADMIN"."STREAMS_Q"@STREAMS1			Enqueueing LCRS				STREAMS2.US.ORACLE.C
"STREAMSADMIN"."STREAMS_Q"			Enqueue Enabled, Dequeue Enabled			5589.68	STREAMS2.US.ORACLE.C
LAPPLY_11GR1			EXECUTE TRANSACTION		758	5588.69	STREAMS2.US.ORACLE.C

Action View Statistics

Apply Status

ORACLE Enterprise Manager 10g

Grid Control

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Database Instance: [STREAMS2.us.oracle.com](#) >

Logged in As STREAMSADMIN

Streams

[Overview](#)

[Streams](#)

[Topology](#)

Last Refresh **October 9, 2009 1:30:42 PM PDT**

[Refresh](#)

[View Data](#)

Real Time: 1 Minute Refresh

View Component Level Path Level

Search

[Setup Propagation](#)

[Manage General Handlers](#)

Action

Select	Name	Type	Status	State	Latency (Seconds)	Throughput (Messages/Sec)	Current Transactions Active/Spilled
<input checked="" type="radio"/>	LAPPLY_11GR1			EXECUTE TRANSACTION	884.0	5832.02	6

[Overview](#)

[Streams](#)

[Topology](#)

Apply Statistics

Database Instance: STREAMS2.us.oracle.com > Streams >

Logged in As STREAMSADMIN

View Apply Statistics: LAPPLY_11GR1

[Overview](#) [Streams](#) [Topology](#)

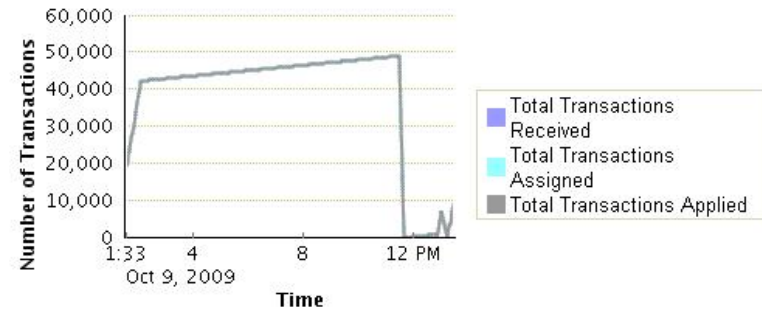
Page Refreshed **October 9, 2009 1:31:26 PM PDT**

View Data

[Queue](#) [Reader](#) [Coordinator](#) [Server](#)

State **APPLYING**
 Transactions Applied **10213**
 Dependency Waits **0**
 Waits to Commit **0**
 Administrative Requests Issued **749**
 Transactions Assigned **10219**
 Transactions Received **10232**
 Total Error Count **0**
 Time Low-watermark was Updated **October 9, 2009 1:30:36 PM PDT**
 Low-watermark Message **941310118**
 Low-watermark Message Create Time **October 9, 2009 1:15:54 PM PDT**
 Time High-watermark was Updated **October 9, 2009 1:30:36 PM PDT**
 High-watermark Message **941310226**
 High-watermark Message Create Time **October 9, 2009 1:15:54 PM PDT**
 Startup Time **October 9, 2009 1:12:58 PM PDT**
 Elapsed Schedule Time (in hundredths of a second) **200**
 Session ID of the coordinator's session [136](#)

Coordinator Statistics



Active Streams Transactions List (Running for more than 1 minute)

This table contains information about each transaction that is being currently processed by this component and is running longer than 1 minute. Click on View Details to navigate to the source database to see transaction details using LogMiner.

Select	Transaction ID	Session ID	Total Messages	Cumulative Messages	First SCN	Last SCN	Active Since	Active For (Seconds)
<input type="radio"/>	330.22.58024		502	502	941310241	941310254	2009-10-09 882	13:15:54.0

Streams Performance Advisor View

Streams Performance Advisor: View Details

Page Refreshed **October 9, 2009 1:27:53 PM PDT**

View Data

[Capture](#) [Propagation](#) **Apply** [Queue](#)

Component Level Statistics

Name	Component Database	Path ID	Bottleneck	Latency (Seconds)	Message Apply Rate (Messages/Sec)	Transaction Apply Rate (Txn/Sec)
APPLY_1	STREAMSB.US.ORACLE.COM	2	NO	2.1	.01	.01
LAPPLY_10GR2	STR10LCZ.US.ORACLE.COM	1	NO	2	939.38	3.94
LAPPLY_11GR1	STREAMS2.US.ORACLE.COM	3	NO	806	5677.87	11.43

Session Level Statistics

Name	Component Database	Type	Subcomponent Type	Idle (%)	Flow Control (%)	Top Wait Event (%)		
						I	II	III
LAPPLY_11GR1	STREAMS2.US.ORACLE.COM	APPLY	APPLY READER	7.91	82.73	EVENT: CPU + Wait for CPU:9.35		
APPLY_1	STREAMSB.US.ORACLE.COM	APPLY	APPLY SERVER	100	0			
LAPPLY_11GR1	STREAMS2.US.ORACLE.COM	APPLY				EVENT: db file sequential read:76.98		
LAPPLY_11GR1	STREAMS2.US.ORACLE.COM	APPLY	COORDINATOR	99.28	0	EVENT: CPU + Wait for CPU:72		
APPLY_1	STREAMSB.US.ORACLE.COM	APPLY	APPLY READER	100	0			
APPLY_1	STREAMSB.US.ORACLE.COM	APPLY	COORDINATOR	100	0			
LAPPLY_11GR1	STREAMS2.US.ORACLE.COM	APPLY	APPLY SERVER	15.11	0	EVENT: CPU + Wait for CPU:12.95	EVENT: eng: TX - index contention:4.32	EVENT: db file sequential read:64.75

[Capture](#) [Propagation](#) **Apply** [Queue](#)

Apply Server Statistics

ORACLE Enterprise Manager 10g Setup Preferences Help Logout
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 Database Instance: STREAMS2.us.oracle.com > Streams > Logged in As STREAMSADMIN
View Apply Statistics: LAPPLY_11GR1
 Overview Streams Topology

Page Refreshed **October 9, 2009 1:32:05 PM PDT** Refresh

View Data Manually

Queue Reader Coordinator **Server**

View Details Previous 1-5 of 12 Next 5

Select	Server ID	XIDUSN	XIDSLT	XIDSQN	Total Transactions Assigned	Total Messages Applied	State	Applied Message Number
<input checked="" type="radio"/>	1				828	411156	IDLE	941307212
<input type="radio"/>	2				822	407156	EXECUTE TRANSACTION	941307303
<input type="radio"/>	3				795	393590	IDLE	941307301
<input type="radio"/>	4				818	404519	EXECUTE TRANSACTION	941307175
<input type="radio"/>	5				825	406650	IDLE	941307283

Queue Reader Coordinator **Server**

Overview Streams Topology

ORACLE Enterprise Manager 10g Setup Preferences Help Logout
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 Database Instance: STREAMS2.us.oracle.com > Streams > View Apply Statistics > Logged in As STREAMSADMIN
Apply Server Details: LAPPLY_11GR1

Page Refreshed **October 9, 2009 1:32:32 PM PDT** Refresh

View Data Manually

Server ID	1	Message Number	2
XIDUSN		Total Transactions Assigned	973
XIDSLT		Total Number of Administrative Jobs Done	71
XIDSQN		Total Messages Applied	482446
Commit SCN	941321162	Apply Time	October 9, 2009 1:32:32 PM PDT
Depends on	XIDUSN	Applied Message Number	941321152
Depends on	XIDSLT	Applied Message Create Time	October 9, 2009 1:17:03 PM PDT
Depends on	XIDSQN	Elapsed Dequeue Time (in hundredths of a second)	262
State	EXECUTE TRANSACTION	Elapsed Apply Time	75965
Serial Number	3	Session ID	140

Apply Server Statistics

ORACLE Enterprise Manager 10g
Grid Control

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Database Instance: STREAMS2.us.oracle.com > [Top Activity](#) >

Logged in As STREAMSADMIN

Session Details: 140 (SYS)

Collected From Target Oct 9, 2009 1:33:00 PM PDT

View Data Real Time: 15 Second Refresh

General

[Activity](#)

[Statistics](#)

[Open Cursors](#)

[Blocking Tree](#)

[Wait Event History](#)

[Parallel SQL](#)

[SQL Monitoring](#)

Server

Current Status **ACTIVE**
Serial Number **3**
DB User Name [SYS](#)
OS Process ID **13324**
Login Time **Oct 9, 2009 1:12:58 PM**
Login Duration **20:3 (mm:ss)**
Connection Type **DEDICATED**
Type **USER**
Resource Consumer Group **Unavailable**

Client

OS User Name **oracle**
OS Process ID **13324**
Host **halinux13**
Terminal **UNKNOWN**
Current Client ID **Unavailable**
Current Client Info **Unavailable**

Application

Current SQL [9p2cud9gjyxrg](#)
Current SQL Command **INSERT**
Last Call Duration **20:0 (mm:ss)**
SQL Trace **DISABLED**
Current SQL Trace Level **1**
Trace With Wait Information **DISABLED**
Trace With Bind Information **DISABLED**
Open Cursors **4**
Program **oracle@halinux13 (AS02)**
Service [SYS\\$USERS](#)
Current Module [STREAMS](#)
Current Action [STREAMS Apply Server](#)

Contention

Blocking Session ID **None**

Wait

Current Wait Event [db file sequential read](#)
Current Wait Class **User I/O**
Wait Duration **1 (s)**
P1 **file# +EVA1_DATA/streamsb /dataf...soebigts.dbf**
P2 **block# 579854**
P3 **blocks 1**
Object [SOEBIG_OI_QUANTITY](#)

Other

Parsing Schema **SYS**
Failover Type **NONE**
Failover Method **NONE**
Failed Over **NO**
PDML Status **DISABLED**
PDDL Status **ENABLED**
PQ Status **ENABLED**
Current Queue Duration **0 (s)**

General

[Activity](#)

[Statistics](#)

[Open Cursors](#)

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[SQL Monitoring](#)

Session Information

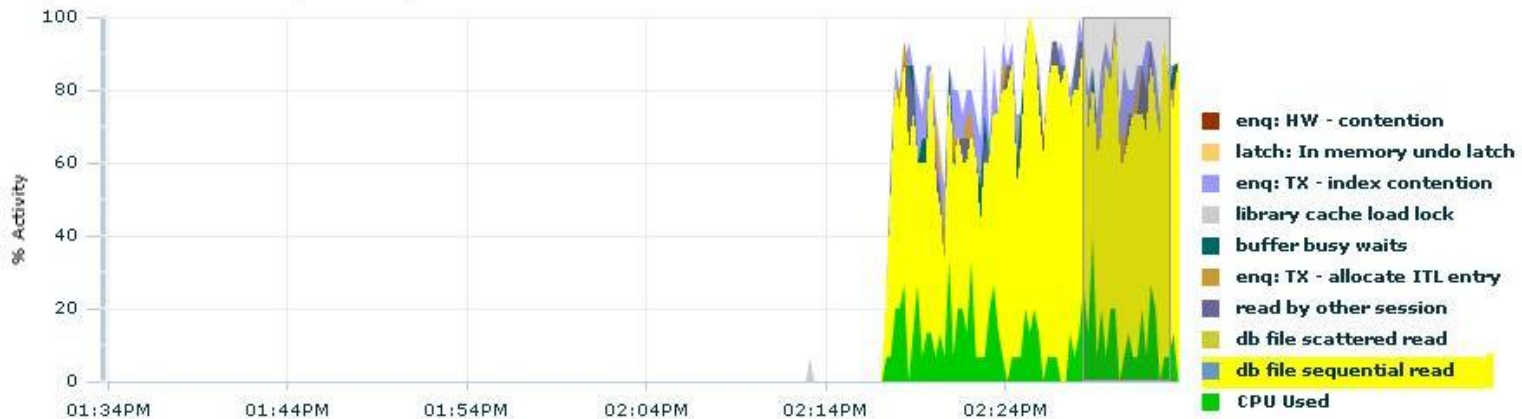
Session Details: 140 (SYS)

Collected From Target **Oct 9, 2009 1:33:28 PM PDT**

View Data

[General](#) **[Activity](#)** [Statistics](#) [Open Cursors](#) [Blocking Tree](#) [Wait Event History](#) [Parallel SQL](#) [SQL Monitoring](#)

Drag the shaded box to change the time period for the detail section below.



Detail for Selected 5 Minute Interval

Start Time **Oct 9, 2009 1:28:23 PM**

View

Activity (%)	SQL ID	QC SID	SQL Command	Plan Hash Value	Module	Action	Client ID
72.87	9p2cud9gixxrg		INSERT	0	STREAMS	STREAMS Apply Server	
22.48	9p2cud9gixxrg		INSERT	3132457624	STREAMS	STREAMS Apply Server	
4.26			UNKNOWN	0	STREAMS	STREAMS Apply Server	
.39	6vqdyfat7dj		INSERT	0	STREAMS	STREAMS Apply Server	

Session Information – SQL Identification

ORACLE Enterprise Manager 10g
Grid Control

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Database Instance: STREAMS2.us.oracle.com > Top Activity > Logged in As STREAMSADMIN

SQL Details: 9p2cud9gjyrg

Switch to SQL ID View Data Real Time: Manual Refresh

Text

```
insert /*+ restrict_all_ref_cons */ into "SOEBIG"."ORDER_ITEMS"  
p("LINE_ITEM_ID", "ORDER_ID", "PRODUCT_ID", "QUANTITY", "UNIT_PRICE") values (:1, :2, :3, :4, :5)
```

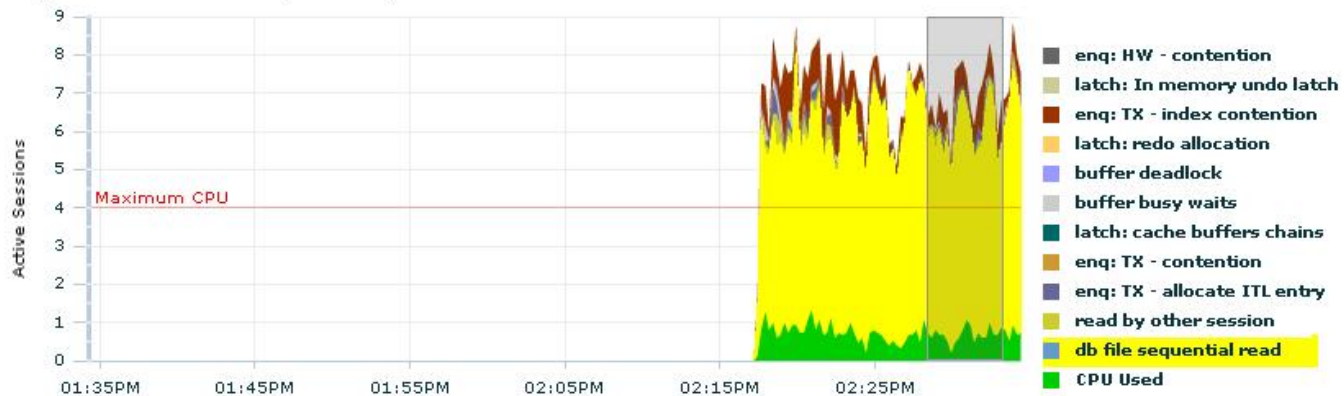
Details

Select the plan hash value to see the details below. Plan Hash Value

[Statistics](#) [Activity](#) [Plan](#) [Plan Control](#) [Tuning History](#) [SQL Monitoring](#)

Summary

Drag the shaded box to change the time period for the detail section below.



Detail for Selected 5 Minute Interval

Start Time Oct 9, 2009 1:28:23 PM

Streams Performance Advisor Page

Advisor Central

ORACLE Enterprise Manager 10g Grid Control Setup Preferences Help Logout

Home **Targets** Deployments Alerts Compliance Jobs Reports

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Database Instance: STREAMS2.us.oracle.com > Advisor Central > Logged in As STREAMSADMIN

Streams Performance Advisor

Streams Performance Advisor provides an accurate depiction of the performance of each component of the streams infrastructure and recommends how to improve overall streams performance. This includes providing throughput and latency measurements for each component as well as statistics about each component such as whether it is the bottleneck of a topology stream, whether it is experiencing flow control and whether it is aborted.

Streams Components

The following table lists the streams components that are part of the streams configurations of this database and other related databases. Select the streams component and click on the 'View Details' to view the performance analysis for that component or click on 'View All Details' to view details of the entire streams configuration that this database is part of.

[View All Details](#)

Select	Name	Type	Path ID	Component Database	Bottleneck	Latency (Seconds)	Throughput (Messages/Sec)
<input type="radio"/>	STR10LCY.US.ORACLE.C		1	STR10LCZ.US.ORACLE.COM		N/A	N/A
<input type="radio"/>	"STREAMSADMIN"."LAPP		1	STR10LCZ.US.ORACLE.COM		N/A	948.53
<input type="radio"/>	APPLY_1		3	STREAMSB.US.ORACLE.COM		0	N/A
<input type="radio"/>	LAPPLY_10GR2		1	STR10LCZ.US.ORACLE.COM		1	968.99
<input type="radio"/>	"STREAMSADMIN"."INBO		3	STREAMSB.US.ORACLE.COM		N/A	N/A
<input type="radio"/>	CAPTURE_1		3	STREAMSA.US.ORACLE.COM		0	N/A
<input type="radio"/>	"STREAMSADMIN"."OUTB		3	STREAMSA.US.ORACLE.COM		N/A	N/A
<input checked="" type="radio"/>	LAPPLY_11GR1		2	STREAMS2.US.ORACLE.COM		269	2673.39
<input type="radio"/>	"STREAMSADMIN"."STRE		2	STREAMS2.US.ORACLE.COM		N/A	2752.91
<input type="radio"/>	"STREAMSADMIN"."STRE		2	STREAMS2.US.ORACLE.COM		N/A	N/A
<input type="radio"/>	"STREAMSADMIN"."OUTB		3	STREAMSB.US.ORACLE.COM		N/A	N/A
<input type="radio"/>	"STREAMSADMIN"."LCAP		1	STR10LCY.US.ORACLE.COM		0	951.77
<input type="radio"/>	LCAPTURE_11GR1		2	STREAMS1.US.ORACLE.COM		268	27213.36
<input type="radio"/>	LCAPTURE_10GR2		1	STR10LCY.US.ORACLE.COM		0	955.27
<input type="radio"/>	"STREAMSADMIN"."OUTB		3	STREAMSA.US.ORACLE.COM		0	N/A
<input type="radio"/>	"STREAMSADMIN"."STRE		2	STREAMS1.US.ORACLE.COM		N/A	2692.79
<input type="radio"/>	"STREAMSADMIN"."LCAP		1	STR10LCY.US.ORACLE.COM		N/A	952.19
<input type="radio"/>	"STREAMSADMIN"."STRE		2	STREAMS1.US.ORACLE.COM		268	2693.86

[View Details](#)

Streams Replication Made Easy

Grid Control is a great tool for managing Streams

- Streams configuration
- Monitoring Streams
- Troubleshooting a Streams environment

Oracle MAA Partners

Working together with HP ...

- Part of MAA means proving and testing our best practices, and working closely with our hardware vendor partners to ensure that our joint solutions work well together.
- Hewlett-Packard (HP) and the Oracle Maximum Availability (MAA) team have worked together to produce best possible integration solutions and best practices for deploying Oracle Streams.



i n v e n t

Streams Resources

- **Oracle Streams Technology Portal on OTN:**
<http://otn.oracle.com/products/dataint/content.html>
- **Oracle Streams Customer Success Stories on OTN:**
http://www.oracle.com/technology/deploy/availability/htdocs/HA_CaseStudies.html#streams
- **10.2 Oracle Streams Recommendations and Best Practices**
 - *Streams Configuration Best Practices (10.2)* on OTN
 - *Streams Performance Tuning Best Practices (10.2)* on OTN
- **MyOracle Support Notes**
 - 784021.1 - Streams and Enterprise Manager 10g Release 5 Grid Control
 - 556742.1 - Extended Datatype Support

HA Sessions, Labs, & Demos by Oracle Development

Sunday, 11 October – Hilton Hotel Imperial Ballroom B

3:45p Online Application Upgrade

Monday, 12 October – Marriott Hotel Golden Gate B1

11:30a Introducing Oracle GoldenGate Products

Monday, 12 October – Moscone South

1:00p Oracle's HA Vision: What's New in 11.2, Room **103**

4:00p Database 11g: Performance Innovations, Room **103**

2:30p **Oracle Streams: What's New in 11.2**, Room **301**

5:30p Comparing Data Protection Solutions, Room **102**

Tuesday, 13 October – Moscone South

11:30a **Oracle Streams: Replication Made Easy**, Room **308**

11:30a Backup & Recovery on the Database Machine, Room **307**

11:30a Next-Generation Database Grid Overview, Room **103**

1:00p Oracle Data Guard: What's New in 11.2, Room **104**

2:30p **GoldenGate and Streams - The Future**, Room **270**

2:30p Backup & Recovery Best Practices, Room **104**

2:30p Single-Instance RAC, Room **300**

4:00p Enterprise Manager HA Best Practices, Room **303**

Tuesday, 13 October – Marriott Hotel Golden Gate B1

11:30a GoldenGate Zero-Downtime Application Upgrades

1:00p GoldenGate Deep Dive: Architecture for Real-Time

Wednesday, 14 October – Moscone South

10:15a Announcing OSB 10.3, Room **300**

11:45a Active Data Guard, Room **103**

5:00p Exadata Storage & Database Machine, Room **104**

Thursday, 15 October – Moscone South

9:00a Empowering Availability for Apps, Room **300**

12:00p Exadata Technical Deep Dive, Room **307**

1:30p Zero-Downtime DB Maintenance, Room **103**

Hands-on Labs Marriott Hotel Golden Gate B2

Monday 11:30a-2:00p Oracle Active Data Guard, Parts I & II

Thursday 9:00a-11:30a Oracle Active Data Guard, Parts I & II

Demos Moscone West DEMOGrounds

Mon & Tue 10:30a - 6:30p; Wed 9:15a - 5:15p

Maximum Availability Architecture (MAA), **W-045**

Oracle Streams: Replication & Advanced Queuing, **W-043**

Oracle Active Data Guard, **W-048**

Oracle Secure Backup, **W-044**

Oracle Recovery Manager & Flashback, **W-046**

Oracle GoldenGate, **3709**

For More Information

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