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## **Grid Control 10.2.0.5: Streams Management**

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# Managing Streams with Grid Control

## Document Structure

- This document is a presentation on managing and monitoring an Oracle Streams configuration using Oracle Enterprise Manager Grid Control 10.2.0.5
- This document is a sequence of two-slide units
  - First slide of the unit presents a topic, through a screenshot
  - Next slide in the unit (tagged “Notes”) elaborates on the topic / screenshot with additional text

# 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

# Grid Control 10.2.0.5

## Simplified Management, Fine-Grained Monitoring

- Oracle Enterprise Manager (EM) Grid Control 10.2.0.5 simplifies Streams configuration and monitoring, with enhanced wizards and Streams management pages. Monitoring can be performed at the individual component level at a database or end-to-end(path from source to target) for the configuration. Alerts are enabled “out of the box” based on process status/errors and latency.

# Streams Configuration Wizards

## Streams

Cancel Continue

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.

Cancel Continue

# Streams Configuration Wizards

- Configuring Streams Replication is simple with Enterprise Manager. You can choose to configure replication between a source and target database for specific tables, schemas, or the entire database. You can even choose to configure at the replication at the granularity of tablespaces: Streams is configured for each table within the tablespace and initial data load (instantiation) is performed using transportable tablespaces.
- Configuring at the schema level is an easy way to get all of the tables in one or more schemas replicated. If there are tables that you don't want to replicate, the wizard allows you to exclude them automatically.
- The wizards can even help you configure capture at another database so that capture processing is offloaded from the production database. The Setup Downstream Capture wizard walks you thru the steps to configure the log transport as well as the replication configuration.

# Setup Replication for Schema *TEST4*

## Setup Wizard

Source Options Destination Options Replication Options Schedule Review

### Setup Streams Replication: Object Selection

Select the list of schemas that should be included in the replication process. You can also exclude some of the tables from a schema using the exclude table options below. Cancel Step 1 of 5 Next

**▼ Include Schemas**

**Search**  
Optionally enter a schema name to filter the data that is displayed in your results set.

Schema  Go

Previous 1-10 of 11 Next 1

Select All | Select None

**Select Schema**

<input type="checkbox"/>	BMPTKT
<input type="checkbox"/>	DIP
<input type="checkbox"/>	ORACLE_OCM
<input type="checkbox"/>	OUTLN
<input type="checkbox"/>	STREAMSADMIN
<input type="checkbox"/>	TEST1
<input type="checkbox"/>	TEST2
<input type="checkbox"/>	TEST3
<input checked="" type="checkbox"/>	TEST4
<input type="checkbox"/>	TSMSYS

Previous 1-10 of 11 Next 1

**▼ Exclude Tables**

To exclude certain tables from the schemas that will be configured for replication, click the Exclude Tables button. This will allow you to exclude certain tables from the schemas listed in the above table.

Add

Select Schema	Table
No Items Found	

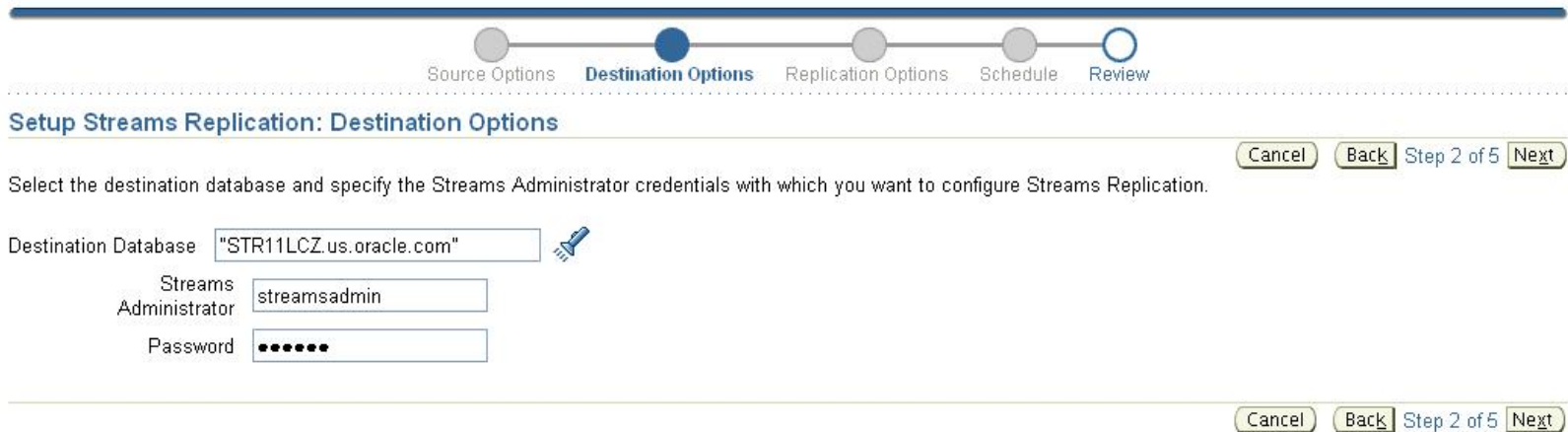
# Setup Replication for Schema *TEST4*

## Setup Wizard

- The wizard consists of 5 steps with a status bar at the top to show where you are in the process.
- The first page of the wizard sets up the source database options. In particular, the page allows you to choose what to replicate. In this example, the TEST4 schema will be replicated in its entirety. A search box exists to filter the list of database schemas available. To eliminate specific tables in the schema from replication, open the Exclude Tables section and ADD the table to the list.

# Identify TARGET Database

## Setup Wizard




The image shows a wizard interface for setting up Streams Replication. At the top, a progress bar indicates five steps: Source Options, Destination Options (current step), Replication Options, Schedule, and Review. Below the progress bar, the title is "Setup Streams Replication: Destination Options". On the right side, there are buttons for "Cancel", "Back", "Step 2 of 5", and "Next". The main instruction reads: "Select the destination database and specify the Streams Administrator credentials with which you want to configure Streams Replication." There are three input fields: "Destination Database" with the value "STR11LCZ.us.oracle.com" and a help icon, "Streams Administrator" with the value "streamsadmin", and "Password" with masked characters "••••••". At the bottom right, there are buttons for "Cancel", "Back", "Step 2 of 5", and "Next".

Source Options **Destination Options** Replication Options Schedule Review

Setup Streams Replication: Destination Options

Cancel Back Step 2 of 5 Next

Select the destination database and specify the Streams Administrator credentials with which you want to configure Streams Replication.

Destination Database  

Streams Administrator

Password

Cancel Back Step 2 of 5 Next

# Identify TARGET Database

## Setup Wizard

- The 2nd step configures the destination database. Choose the destination database using the flashlight to identify the list of databases available. Provide the streams administrator schema and login password for the destination database.

# Replication Options

## Setup Wizard

ORACLE Enterprise Manager 10g Grid Control Setup Preferences Help Logout

Home Targets Deployments Alerts Compliance Jobs Reports

● Source Options ● Destination Options ● **Replication Options** ● Schedule ○ Review

---

### Setup Streams Replication: Replication Options

Cancel Back Step 3 of 5 Next

**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

Select the log parameter that will be used for sending data to the downstream database using logminer process. This parameter is set during the creation of downstream capture process.

Log Parameter

Select an existing Streams Capture process, or specify a new name and a new capture process will be created. The Capture process runs in the source database in case of local capture and in the downstream database in case of downstream capture.

# Replication Options

## Setup Wizard

- The 3rd step configures the replication options. Datapump export/import is used to instantiate the data (ie, copy the data) from the source to the target database. While the wizard automatically chooses a directory on both the source and destination databases, you can specify another directory, if you choose. Alternatively, you can choose an existing database directory object by clicking on the “Specify Directory objects” check box.
- By default, the wizard configures uni-directional replication. To choose bi-directional replication or control other replication options, open the “Advanced Options” section of this page.
- It is also possible to explicitly name or choose an existing capture, propagation, and apply process in the Advanced Options.

# Replication Options (continued)

## Setup Wizard

Capture Name



Enter a name for the capture process, if it is left blank then setup process will create a default name while performing the setup

### Propagation Process

Select an existing Streams Propagation process, or specify a new name and a new propagation process will be created. The Propagation process runs in the source database in case of local capture and in the downstream database in case of downstream capture.

Propagation Name



Enter a name for the propagate process, if it is left blank then setup process will create a default name while performing the setup

### Apply Process

Select an existing Streams Apply process, or specify a new name and a new apply process will be created. The Apply process runs in the destination database.

Apply Name



Enter a name for the apply process, if it is left blank then setup process will create a default name while performing the setup

[Cancel](#)

[Back](#)

Step 3 of 5

[Next](#)

[Home](#) | [Targets](#) | [Deployments](#) | [Alerts](#) | [Compliance](#) | [Jobs](#) | [Reports](#) | [Setup](#) | [Preferences](#) | [Help](#) | [Logout](#)

# Replication Options (continued)

## Setup Wizard

- The previous slide continues the display of the Advanced Options for the wizard . This section can be used to explicitly identify a new name or an existing name for the capture, propagation, or apply process. If the name is left blank, the setup process will create a name for the process.

# Schedule Job

## Setup Wizard

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Compliance Jobs Reports Setup Preferences Help Logout

Source Options Destination Options Replication Options **Schedule** Review

### Setup Streams Replication: Schedule Job

You can choose to run the setup immediately or schedule the setup to run later.

Time Zone **Repository**

**Start**

Immediately  
 Later

Date    
(example: Mar 23, 2009)

Time     AM  PM

Cancel Back Step 4 of 5 Next

Home | Targets | Deployments | Alerts | Compliance | Jobs | Reports | Setup | Preferences | Help | Logout

# Schedule Job

## Setup Wizard

- The 4th step controls when to perform the actual setup. If “Later” is chosen with a specific date/time, an EM job is scheduled to perform the work.

# Replication Setup Review

## Setup Wizard

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Compliance Jobs Reports

Setup Preferences Help Logout

Source Options Destination Options Replication Options Schedule **Review**

### Setup Streams Replication: Review

Cancel Edit Scripts Back Step 5 of 5 Submit

Review the summary results and click the submit button to start the replication setup process. Setup process will be started as the Enterprise Manager job. You can also edit the configuration parameters by using the edit script option.

Source Database	Destination Database
Host Name <b>140.87.25.29</b>	Host Name <b>140.87.25.32</b>
Host Username <b>sadattaw</b>	Database <b>STR11LCZ.US.ORACLE.COM</b>
Database <b>STR11LCY.US.ORACLE.COM</b>	Database Version <b>11.1.0.7.0</b>
Database Version <b>11.1.0.7.0</b>	Username <b>streamsadmin</b>
Username <b>streamsadmin</b>	Datapump Directory Path <b>/u01/app/oracle/product/11.1.0/11.1.0.7/sidb/rdbms/log/</b>
Datapump Directory Path <b>/u01/app/oracle/product/11.1.0/11.1.0.7/sidb/rdbms/log/</b>	Apply Name <b>APPLY_TEST4</b>
Replication Type <b>Replicate Schemas</b>	
Bi-directional replication enabled <b>No</b>	
DML changes enabled <b>Yes</b>	
DDL changes enabled <b>Yes</b>	
Capture Name <b>CAPTURE_TEST4</b>	

### Object Selection

Selected Schemas

Selected Schemas
TEST4

Cancel Edit Scripts Back Step 5 of 5 Submit

# Replication Setup Review

## Setup Wizard

- The final step allows a review of the selections from the previous pages. If necessary, you can return to previous pages to change selections using the Back button. You can also view the generated script using the Edit Scripts button.
- The script can be edited or saved to a file from the Edit Scripts button as well.
- Once you are satisfied with your selections, click the Submit button. An EM job is submitted, and tracked via the normal EM job system.

# Monitoring with Grid Control

ORACLE Enterprise Manager 10g  
Grid Control

Home Targets Deployments Alerts Compliance Jobs Reports

Hosts | Databases | Web Applications | Services | Systems | Groups | All Targets

Setup Preferences Help Logout

Logged in As STREAMSADMIN

Database Instance: STR11LCY\_stajo01.us.oracle.com

Home Performance Availability Server Schema Data Movement Software and Support

Page Refreshed Mar 23, 2009 12:52:15 PM PDT Refresh View Data Automatically (60 sec)

**General** Shutdown Black Out

Status **Up**

Up Since **Mar 17, 2009 3:54:42 PM PDT**

Instance Name **STR11LCY**

Version **11.1.0.7.0**

Host **stajo01.us.oracle.com**

Listener **LISTENER\_STAJ001\_stajo01.us...**

[View All Properties](#)

**Host CPU**

Load **3.74** Paging **0.00**

**Active Sessions**

Core Count **4**

**SQL Response Time**

Reference collection is empty.

SQL Response Time (%) Unavailable

[Reset Reference Collection](#)

**Diagnostic Summary**

ADDM Findings **0**

Alert Log **Mar 23, 2009 10:11:53 AM**

Active Incidents **3**

**Space Summary**

Database Size (GB) **4.705**

Problem Tablespace **0**

Segment Advisor Recommendations **0**

Dump Area Used (%) **78**

**High Availability**

Console [Details](#)

Instance Recovery Time (sec) **10**

Last Backup **Feb 28, 2009 10:52:17 PM**

Archive Area Used (%) **78**

Flashback Database Logging **Disabled**

Streams Components **1** 2

**Alerts**

Category All [Go](#) Critical **0** Warning **2**

Severity	Category	Name	User Impact	Message	Alert Triggered
Warning	User Audit	Audited User		User SYS logged on from stajo01.	Mar 17, 2009 4:02:03 PM
Warning	Streams Processes Status	Streams Process Status		Alert for PROPAGATION\$_154 for DISABLED is cleared	Mar 23, 2009 12:51:10 PM

# Monitoring with Grid Control

- The database home page of Grid Control includes an entry point to Streams monitoring with a display of the number of Streams components in the High Availability section of the page. This section consists of a state indicator followed by the number of components in that state. The green checkmark indicates that the processes are enabled and running. The exclamation mark in the yellow triangle is a warning – indicating that there is a WARNING alert. Clicking on the number takes you to the Streams Overview page.
- At the bottom of this page are the EM Alerts for the database. Streams alerts based on process status, latency, and process errors are automatically configured. Additional metrics are available for alerting as well from the All Metrics link in the Related Links area (not pictured above).








# Streams Metrics

## Metric and Policy Settings

Cancel OK

**Metric Thresholds** Policies

View Metrics with thresholds ▾

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	<a href="#">Every 5 Minutes</a>	
Streams Apply - (%) Spilled Messages	>	<input type="text" value="60"/>	<input type="text" value="80"/>	None	<a href="#">Every 5 Minutes</a>	
Streams Capture - (%) Spilled Messages	>	<input type="text" value="60"/>	<input type="text" value="80"/>	None	<a href="#">Every 5 Minutes</a>	
Streams - Latency (seconds)	>	<input type="text" value="300"/>	<input type="text" value="900"/>	None	<a href="#">Every 5 Minutes</a>	
Streams Process Errors	>	<input type="text" value="0"/>	<input type="text"/>	None	<a href="#">Every 5 Minutes</a>	
Streams Process Status	=	<input type="text" value="DISABLI"/>	<input type="text" value="ABORTE"/>	None	<a href="#">Every 5 Minutes</a>	
Streams Prop - (%) Messages in Waiting State	>	<input type="text" value="75"/>	<input type="text" value="90"/>	None	<a href="#">Every 5 Minutes</a>	

# Streams Metrics

- Metrics and Alerts for Streams are configured from the EM Metric and Policy Settings page. Warning and Critical Thresholds can be modified to match customer business requirements.
- The Metric and Policy Settings page displays all metrics in alphabetical order. This page has been altered to highlight only the Streams metrics with preset thresholds.

# Grid Control Streams Management

ORACLE Enterprise Manager 10g  
Grid Control

Home | **Targets** | Deployments | Alerts | Compliance | Jobs | Reports | Setup | Preferences | Help | Logout

Hosts | Databases | Web Applications | Services | Systems | Groups | **All Targets**

Database Instance: STR11LCY\_stajo01.us.oracle.com

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

<b>Move Row Data</b> <a href="#">Export to Export Files</a> <a href="#">Import from Export Files</a> <a href="#">Import from Database</a> <a href="#">Load Data from User Files</a> <a href="#">Monitor Export and Import Jobs</a>	<b>Move Database Files</b> <a href="#">Clone Database</a> <a href="#">Transport Tablespaces</a>	<b>Streams</b> <a href="#">Setup</a> <a href="#">Manage Replication</a> <a href="#">Manage Advanced Queues</a>	<b>Advanced Replication</b> <a href="#">Setup</a> <a href="#">Manage</a>
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**Related Links**

<a href="#">Access</a> <a href="#">Alert Log Contents</a> <a href="#">Archive/Purge Alert Log</a> <a href="#">Deployments</a> <a href="#">Jobs</a> <a href="#">Monitoring Configuration</a> <a href="#">Scheduler Central</a> <a href="#">Trace Files</a>	<a href="#">Advisor Central</a> <a href="#">All Metrics</a> <a href="#">Baseline Metric Thresholds</a> <a href="#">EM SQL History</a> <a href="#">Metric and Policy Settings</a> <a href="#">Monitor in Memory Access Mode</a> <a href="#">SQL Worksheet</a> <a href="#">User-Defined Metrics</a>	<a href="#">Alert History</a> <a href="#">Apply Patch</a> <a href="#">Blackouts</a> <a href="#">Execute SQL</a> <a href="#">Metric Collection Errors</a> <a href="#">Reports</a> <a href="#">Target Properties</a>
--	--	--

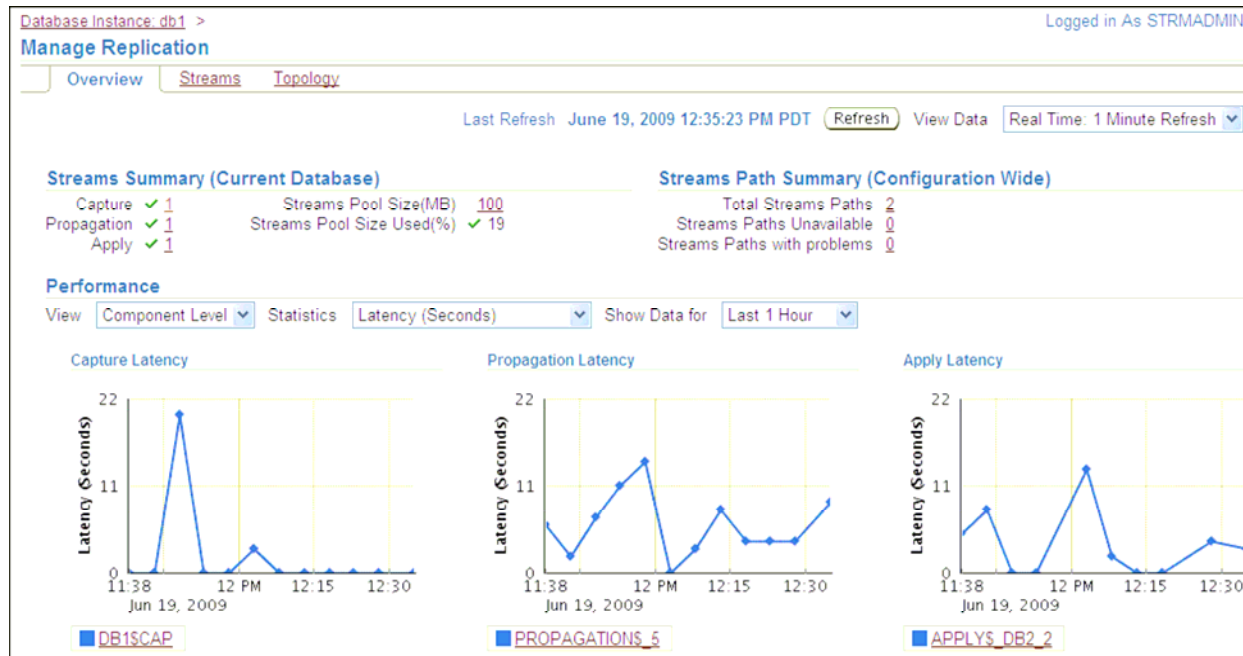
[Home](#) | [Targets](#) | [Deployments](#) | [Alerts](#) | [Compliance](#) | [Jobs](#) | [Reports](#) | [Setup](#) | [Preferences](#) | [Help](#) | [Logout](#)

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# Grid Control Streams Management

- For databases with no existing Streams components, the entry point to Streams is on the Data Movement tab. Clicking on Setup takes you to the wizards page.
- Clicking on Manage Replication when no components exist, directs you to the Setup page. If Streams components exist, then clicking Manage Replication goes to the Overview page of Streams.

# Streams Overview



# Streams Overview

- The Streams Overview page summarizes information about Streams for the current database as well as across databases. Under the Current Database Summary, each component type is listed with a status indicator flag followed by the number of components of the status. For the current database (db1), there is a single capture, propagation, and apply process – and each of those components is up and running (green check in front of the number). Clicking on the number link for capture takes you to the Capture component page. The Streams Pool Size in Megabytes along with the percent of the Streams pool used with a status indicator. The green check associated with the Streams Pool Size Used metric indicates that the metric is within the acceptable range for the Streams Pool size alert threshold. Clicking on the linked number associated with the Streams Pool Size(MB) takes you to a page where you can modify the size of the Streams Pool.
- There are 2 possible Performance views: component and path. In this slide, the component level view displays charts indicating the performance latency of the Streams components of the database DB1 for the last hour. Throughput statistics can also be displayed via the Statistics pull-down menu. The path level view displays charts for latency and throughput for the top 5 paths monitored with Grid Control.

# Monitor Streams by Database

Database Instance: STR11LCY stao01.us.oracle.com >

Logged in As STREAMSADMIN

## Manage Replication

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

Last Refresh **March 29, 2009 10:34:49 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"/>	STR11LCY\$CAP			CAPTURING CHANGES	0.0	0.12	1 n/a
<input type="radio"/>	PROPAGATION\$_154			ENABLED	0.0	0.12	n/a n/a
<input type="radio"/>	DUMMY_APPLY			DEQUEUE MESSAGES	0.0	0.0	0 0

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

### 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

[View Transaction Details](#)

Select	View Transaction Details	Session ID	Total Messages	Cumulative Messages	First SCN	Last SCN	Active Since	Active For (Seconds)
<input checked="" type="radio"/>	<a href="#">View Transaction Details</a>	27.8.546	113	n/a	3 22324267	22324918	2009-03-29 22:00:11.0	2133

**1 active transaction for capture**

# Monitor Streams by Database

- The database home page of Grid Control includes an entry point to Streams monitoring with a display of the number of Streams components in the High Availability section of the page. This section consists of a state indicator followed by the number of components in that state. The green checkmark indicates that the processes are enabled and running. The exclamation mark in the yellow triangle is a warning – indicating that there is a WARNING alert. Clicking on the number takes you to the Streams Overview page.
- At the bottom of this page are the EM Alerts for the database. Streams alerts based on process status, latency, and process errors are automatically configured. Additional metrics are available for alerting as well from the All Metrics link in the Related Links area (not pictured above).

# Monitor Streams by Database

Database Instance: STR11LCY stao01.us.oracle.com >

Logged in As STREAMSADMIN

## Manage Replication

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

Last Refresh **March 29, 2009 10:34:49 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"/>	STR11LCY\$CAP			CAPTURING CHANGES	0.0	0.12	1 n/a
<input type="radio"/>	PROPAGATION\$_154			ENABLED	0.0	0.12	n/a n/a
<input type="radio"/>	DUMMY_APPLY			DEQUEUE MESSAGES	0.0	0.0	0 0

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

### 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

[View Transaction Details](#)

Select	View Transaction Details	Session ID	Total Messages	Cumulative Messages	First SCN	Last SCN	Active Since	Active For (Seconds)
<input checked="" type="radio"/>	<a href="#">View Transaction Details</a>	27.8.546	113	n/a	3 22324267	22324918	2009-03-29 22:00:11.0	2133

**1 active transaction for capture**

# Monitor Streams by Database

- Clicking on the component name goes directly to the statistics page for the component. Clicking on the latency or throughput links goes to the metric collection page for that metric. Clicking on the links in the final column (Current transactions active/spilled) goes to the page showing the active or spilled transactions for the component (shown at bottom of slide). Capture can only show active transactions. Apply can show active or spilled transactions. Spilled transactions for apply are large or long-running transactions that have spilled to disk to free up memory. The threshold at which a transaction spills to disk (count of change records in the transaction) is managed as an apply parameter (TXN\_LCR\_SPILL\_THRESHOLD).
- The View Transaction Details button (Active Streams Transactions List display) sets up an ad-hoc LogMiner session at the source database to review the source transaction.

# Automated Workflow

## Create Source LogMiner Session

The screenshot shows the Oracle Enterprise Manager 10g Grid Control interface. The top navigation bar includes 'Home', 'Targets', 'Deployments', 'Alerts', 'Compliance', 'Jobs', and 'Reports'. The current page is 'LogMiner' for database instance 'STR111.CY\_staj01.us.oracle.com'. The user is logged in as 'STREAMSADMIN'. The interface is divided into several sections:

- Query Time Range:** Radio buttons for 'Time Range' and 'SCN Range'. The 'SCN Range' is selected. Input fields for 'Start SCN' (22324267) and 'End SCN' (22324918) are present. Two tips are shown: 'TIP The oldest SCN available on disk is 20109878 View Archived Logs' and 'TIP Earlier start times are available by restoring archived logs'.
- Query Filter:** Radio buttons for 'View All Transactions' (selected) and 'View DDL Only'. Input fields for 'Table' (with examples 'Scott.Emp, Scott.%') and 'DB User' (with example 'System') are provided.
- Advanced Query:** A section for 'Additional LogMiner Columns' with a text area containing the query: `where XIDUSN=27' and XIDSLT=8' and XIDSQN=546'`. A note below explains that additional columns can be specified using a 'where' clause and provides an example: `where MACHINE_NAME = 'myhost' AND DBMS_LOGMNR.MINE_VALUE(REDO_VALUE, 'SCOTT.DEPT.LOC') = 'BOSTON'`.
- Overview:** A callout box titled 'Overview' explaining that LogMiner allows users to browse transactions by time or SCN range, query fastest by table name, view results by transaction summary or record, and is fully integrated with Flashback Transaction to show dependent transactions and undo a transaction along with dependent transactions.

Buttons for 'Cancel' and 'Continue' are located at the bottom right of the main form and in the overview callout.

# Automated Workflow

## Create Source LogMiner Session

- Clicking on View Transaction Details displays a page with information to automatically set-up of a LogMiner session at the source database. Notice that the screen is pre-populated with the SCN and transaction id information from the previous page. The Advanced Query section can be used to further filter the information from the v\$logmnr\_contents view.
- Typically all you need to do on this page is click the Continue button.

# Automated Workflow

## Review Source Transaction

ORACLE Enterprise Manager 10g Setup Preferences Help Logout  
 Grid Control Home **Targets** Deployments Alerts Compliance Jobs Reports

Hosts | Databases | Web Applications | Services | Systems | Groups | All Targets

Database Instance: STR11LCY\_stajo01.us.oracle.com > Logged in As STREAMSADMIN

### LogMiner Results

[Back](#) [Done](#)

**Summary**

Matching Transactions 1      Query Filter **where XIDUSN='27' and XIDSLT='8' and XIDSQN='546'**  
 Matching Redo Records 7      Total Time **5 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 ID	SCN	Operation	Schema	Table	SQL Redo
<a href="#">1B00080022020000</a>	22324267	START			set transaction read write;
<a href="#">1B00080022020000</a>	22324267	DELETE	TEST1	BLOBTAB	delete from "TEST1"."BLOBTAB" where "INDEX_COL" = 1 and ROWID = 'AAAEgPAAHAAAACATAA';
<a href="#">1B00080022020000</a>	22324267	INTERNAL			
<a href="#">1B00080022020000</a>	22324267	INTERNAL			
<a href="#">1B00080022020000</a>	22324918	INTERNAL			
<a href="#">1B00080022020000</a>	22324918	UPDATE	TEST2	BLOBTAB	update "TEST2"."BLOBTAB" set "BLOB_COL" = NULL where "INDEX_COL" = 101 and ROWID = 'AAAEgYAAIAAAPkWABk';
<a href="#">1B00080022020000</a>	22324918	INTERNAL			

[Back](#) [Done](#)

# Automated Workflow

## Review Source Transaction

- There are 2 ways to view the information returned: summary information, or Redo Record. The above is a View by Redo Record. This slide shows the DML changes made by transaction id 27.8.546: a DELETE from the TEST1.BLOBTAB table and an UPDATE to the TEST2.BLOBTAB table.

# Manage Process Parameters

## Example: Apply Parameters

ORACLE Enterprise Manager 10g  
Grid Control

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

[Home](#) [Targets](#) [Deployments](#) [Alerts](#) [Compliance](#) [Jobs](#) [Reports](#)

[Hosts](#) | [Databases](#) | [Web Applications](#) | [Services](#) | [Systems](#) | [Groups](#) | **All Targets**

Database Instance: STR11LCY stajo01.us.oracle.com > [Manage Replication](#) >

Logged in As STREAMSADMIN

Edit Apply: DUMMY\_APPLY

[Revert](#) [Apply](#)

### Parameters

[Restore Default Values](#)

Name	Value	Set by user
PARALLELISM	1	NO
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	Y	NO
COMMIT_SERIALIZATION	FULL	NO
ALLOW_DUPLICATE_ROWS	N	NO
TXN_LCR_SPILL_THRESHOLD	10000	NO
PRESERVE_ENCRYPTION	Y	NO
RTRIM_ON_IMPLICIT_CONVERSION	Y	NO

# Manage Process Parameters

## Example: Apply Parameters

- Parameters for both capture and apply can be modified using the Edit Parameters Action for the component.

# Monitor Streams Activity by Path

## 11g Database

ORACLE Enterprise Manager 10g Grid Control

Home Targets Deployments Alerts Compliance Jobs Reports

Hosts Databases Web Applications Services Systems Groups All Targets

Database Instance: STR11LCY\_staj001.us.oracle.com > Logged in As STREAMSADMIN

### Manage Replication

Overview Streams Topology

Refreshing... Last Refresh March 23, 2009 11:49:05 AM PDT Refresh View Data Real Time: 1 Minute Refresh

View  Component Level  Path Level

Search All  Go

Action Enable  Go

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"/>			7	1345.62	
<input type="radio"/> STR10LCY\$CAP		<input checked="" type="radio"/>	CREATING LCR		0	3067.07	STR10LCY.US.ORACLE.COM
<input type="radio"/> "STREAMSADMIN"."STR10LCY\$CAPQ"		<input checked="" type="radio"/>	Enqueue Enabled, Dequeue Enabled			1529.93	STR10LCY.US.ORACLE.COM
<input type="radio"/> "STREAMSADMIN"."STR10LCY\$CAPQ"=>STR		<input checked="" type="radio"/>	ENABLED		0	1341.76	STR10LCY.US.ORACLE.COM
<input type="radio"/> STR10LCY.US.ORACLE.COM=>"STREAMSADM		<input checked="" type="radio"/>					STR10LCZ.US.ORACLE.COM
<input type="radio"/> "STREAMSADMIN"."STR10LCY\$APPQ"		<input checked="" type="radio"/>	Enqueue Enabled, Dequeue Enabled			1411.03	STR10LCZ.US.ORACLE.COM
<input type="radio"/> APPLY\$_STR10LCY_3		<input checked="" type="radio"/>	DEQUEUE MESSAGES		7	1345.62	STR10LCZ.US.ORACLE.COM
<input type="radio"/> STR11LCY.US.ORACLE.COM=>STR11LCY.US		<input checked="" type="radio"/>			-1	.01	
<input type="radio"/> STR11LCY.US.ORACLE.COM=>STR11LCZ.US		<input checked="" type="radio"/>			4	201.97	
<input type="radio"/> STR11LCY\$CAP		<input checked="" type="radio"/>	PAUSED FOR FLOW CONTROL		2	589.2	STR11LCY.US.ORACLE.COM
<input type="radio"/> "STREAMSADMIN"."STR11LCY\$CAPQ"		<input checked="" type="radio"/>	Enqueue Enabled, Dequeue Enabled			292.17	STR11LCY.US.ORACLE.COM
<input type="radio"/> "STREAMSADMIN"."STR11LCY\$CAPQ"=>"ST		<input checked="" type="radio"/>	Pausing for flow control		2	292.13	STR11LCY.US.ORACLE.COM
<input type="radio"/> "STREAMSADMIN"."STR11LCY\$CAPQ"@STR1		<input checked="" type="radio"/>	Enqueueing LCRS				STR11LCZ.US.ORACLE.COM
<input type="radio"/> "STREAMSADMIN"."STR11LCY\$APPQ"		<input checked="" type="radio"/>	Enqueue Enabled, Dequeue Enabled			324.93	STR11LCZ.US.ORACLE.COM
<input type="radio"/> APPLY\$_STR11LCY_101		<input checked="" type="radio"/>	IDLE		4	201.97	STR11LCZ.US.ORACLE.COM

Action Enable  Go

# Monitor Streams Activity by Path

## 11g Database

- Path monitoring uses the 11g Streams Performance Advisor feature to discover the topology, collect statistics, and provide analysis of the Streams path. It is possible to monitor 10g databases by path as long as using an 11.1.0.7 database to perform the monitoring functions. The 11g database does not need to be a source or target database in a Streams configuration. Refer to MyOracle Support Note 784021.1 for further details on this.
- The previous slide shows monitoring of both 10g and 11g databases by path. When a specific path is expanded, each component in the path is displayed from the source capture to the target apply in the appropriate order represented with an icon in the Type column: capture, queue, propagation sender, propagation receiver, queue, and apply. The status of each component is visible (up,down arrows) along with the current run State, Latency, and Throughput rates. The rightmost column identifies the database on which the component resides. Notice that both the components and component database are links. These links take you directly to the component or the component database, as appropriate. You can also use this page to directly manage each component by clicking the radio button in the Select column for the specific component, then choosing an Action (Enable/Disable, View Performance Analysis Data, View Statistics etc), and clicking the Go button for the Action.

# Streams Performance Advisor View

Database Instance: STR11LCY\_stajo01.us.oracle.com > Advisor Central > Streams Performance Advisor >

Logged in As STREAMSADMIN

Streams Performance Advisor: View Details

Page Refreshed **March 6, 2009 12:42:05 AM PST**

View Data

## Component Level Statistics

Name	Component Database	Path ID	Bottleneck	Latency (Seconds)	Message Apply Rate (Messages/Sec)	Transaction Apply Rate (Txn/Sec)
DUMMY_APPLY	STR11LCY.US.ORACLE.COM	2	NO	-1	.01	.01
APPLY\$_STR11LCY_36	STR11LCZ.US.ORACLE.COM	11	NO	31	1868.25	4.66
APPLY_BMPTKT	STR11LCZ.US.ORACLE.COM	12	NO	31	.02	.01
APPLY\$_STR10LCY_3	STR10LCZ.US.ORACLE.COM	1	NO	1026	.01	.01

## Session Level Statistics

Name	Component Database	Type	Subcomponent Type	Idle (%)	Flow Control (%)	Top Wait Event (%)		
						I	II	III
APPLY\$_STR11LCY_36	STR11LCZ.US.ORACLE.COM	APPLY	APPLY READER	4.76	86.9	EVENT: CPU + Wait for CPU:8.33		
APPLY_BMPTKT	STR11LCZ.US.ORACLE.COM	APPLY	APPLY COORDINATOR	100	0			
APPLY_BMPTKT	STR11LCZ.US.ORACLE.COM	APPLY	APPLY SERVER	100	0			
APPLY\$_STR11LCY_36	STR11LCZ.US.ORACLE.COM	APPLY				EVENT: CPU + Wait for CPU:8.33	EVENT: log file switch (checkpoint incomplete):8.33	EVENT: CPU + Wait for CPU:71.43
APPLY_BMPTKT	STR11LCZ.US.ORACLE.COM	APPLY	APPLY READER	100	0			
DUMMY_APPLY	STR11LCY.US.ORACLE.COM	APPLY	APPLY READER	100	0			
DUMMY_APPLY	STR11LCY.US.ORACLE.COM	APPLY	APPLY SERVER	100	0			
APPLY\$_STR11LCY_36	STR11LCZ.US.ORACLE.COM	APPLY	APPLY SERVER	2.38	0	EVENT: log buffer space:11.9	EVENT: log file switch (checkpoint incomplete):8.33	EVENT: CPU + Wait for CPU:71.43
APPLY\$_STR11LCY_36	STR11LCZ.US.ORACLE.COM	APPLY	APPLY COORDINATOR	100	0			
DUMMY_APPLY	STR11LCY.US.ORACLE.COM	APPLY	APPLY COORDINATOR	100	0			

# Streams Performance Advisor View

- One of the actions for drill down is to View Performance Analysis Data. The focus in this slide is on the Apply tab of the Streams Performance Advisor page for the View Performance Analysis Data action. In the Component Level Statistics frame, the message and transaction rates are shown along with the latency(current time-message creation time at source).
- The Session Level Statistics frame displays information about each apply subcomponent (Apply Reader, Coordinator, and Servers) along with percentage of time in the idle state or in flow control, and the top 3 wait events. For the highlighted Apply Server (red box), wait event time is spent on and waiting for CPU, followed by log buffer waits and log file switch. Normal database tuning recommendations can be used to resolve these wait events.

# Session Information

Database Instance: STR11LCZ.us.oracle.com > Top Activity >

Logged in As STREAMSADMIN

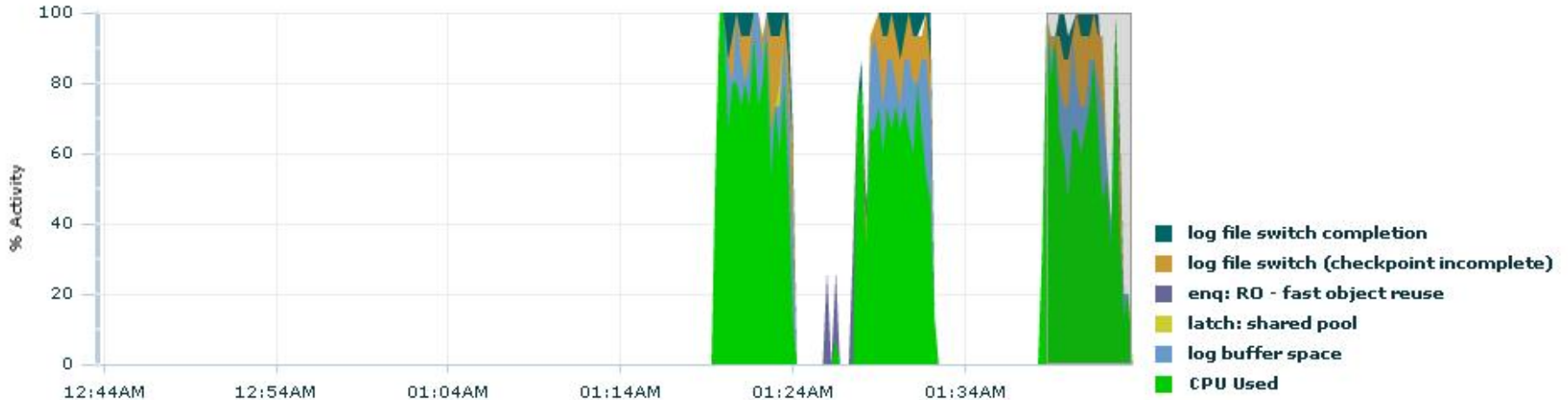
## Session Details: 139 (SYS)

Collected From Target **Mar 6, 2009 12:43:47 AM PST**

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 **Mar 6, 2009 12:38:45 AM** View

Activity (%) ▾	SQL ID	OC SID	SQL Command	Plan Hash Value	Module	Action	Client ID
	20.00 <a href="#">4fpg1jrkqv93f</a>		UNKNOWN	<a href="#">2392531482</a>	STREAMS	STREAMS Apply Server	
	16.60		UNKNOWN	0	STREAMS	STREAMS Apply Server	
	16.17 <a href="#">0s4bxthu1fqxg</a>		UNKNOWN	<a href="#">2392531482</a>	STREAMS	STREAMS Apply Server	
	12.77 <a href="#">q4h51ktsr0ux6</a>		UNKNOWN	<a href="#">2392531482</a>	STREAMS	STREAMS Apply Server	
	9.36 <a href="#">7qg4inf9madw4</a>		SELECT	<a href="#">2392531482</a>	STREAMS	STREAMS Apply Server	

# Session Information

- Alternatively, you can choose the View Statistics action from the Monitor Path page for the apply process which will bring you to the statistics for the specific apply process. From that statistics page for apply, you can drill down into the specific session of interest (apply reader, apply coordinator, apply server) to get to the standard EM database session views for current sql or activity as shown in this chart. In this slide the activity tab was chosen and you can see a lot of time is spent on the CPU along with redo log associated waits (file and buffer). You can drill down even further with ASH.

# Managing Apply Errors

## Automatic Conflict Detection

ORACLE Enterprise Manager 10g Grid Control

Home **Targets** Deployments Alerts Compliance Jobs Reports

Hosts | Databases | Web Applications | Services | Systems | Groups | All Targets

Database Instance: patdb-viewa > Streams > **Apply Errors: APPLY\$\_STRM\_3** Logged in As STRMADMIN

[Common Error Messages](#) Retry all Errors Delete All

Retry Error Delete

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"/>	5.17.1327	1	1	2244539	STRM.WORLD	26786	ORA-26786: A row with key ("ORDER_NUMBER") = (1028) exists but has conflicting column(s) "STATUS" in table DEMO.ORDERS ORA-01403: no data found ORA-06512: at "SYS.LCR\$_ROW_RECORD", line 440 ORA-06512: at "DEMO.ORDERS_DML_HANDLER", line 31 ORA-06512: at line 1	

Home | **Targets** | Deployments | Alerts | Compliance | Jobs | Reports | Setup | Preferences | Help | Logout

ORACLE Enterprise Manager 10g Grid Control

Home **Targets** Deployments Alerts Compliance Jobs Reports

Hosts | Databases | Web Applications | Services | Systems | Groups | All Targets

Database Instance: patdb-viewa > Streams > **Apply Errors** > **View Error LCRs** > **Compare Values: APPLY\$\_STRM\_3** Logged in As STRMADMIN

- 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
STATUS	SYS.VARCHAR2	PENDING	Accepted	MAKEITFAIL
ORDER_NUMBER	SYS.VARCHAR2	1028	1028	1028
DELIVERY_DATE	SYS.DATE		20-SEP-08	
PART_NUMBER	SYS.VARCHAR2	4455	4455	4455

Home | **Targets** | Deployments | Alerts | Compliance | Jobs | Reports | Setup | Preferences | Help | Logout

# Managing Apply Errors

## Automatic Conflict Detection

- An apply error occurs if the data in the row being updated at the target database does not match the source database. This is called a conflict – and can occur when the same row is updated in multiple databases around the same time. Streams identifies the conflict and, if there is no conflict resolution configured, writes the entire transaction to the error queue. This is an example of an 11g error message that identifies the name of the table, the primary key of the row, and the column(s) that conflict in the Error Message. The Message Number column identifies which LCR (Logical Change Record) caused the error. The Message Count column is the total number of LCRs in the transaction. You can use the View Error LCRs button for the transaction to drill down to the actual LCR.
- At the bottom of the slide, is the result of comparing the logical change record with the current database row value. The Old Value and New Value refer to the values within the LCR before the change (Old Value) and after (New Value) the change was made at the source. Current Value is the current value of the row in the target database.

# Automatic Transformations

ORACLE Enterprise Manager 10g  
Grid Control  
Home Targets Deployments  
Hosts | Databases | Web Applications | Services | Systems | Groups | All Targets

Database Instance: STR11LCY\_stajo01.us.oracle.com >  
Manage Replication > Manage Rule Set: RULESET\$ 162 > Logged in As STREAMSADMIN

### Edit Rule

Rule Name: "STREAMSADMIN"."TEST1160"

Rule Condition: `(((((dml.get_object_owner() = TEST1) and :dml.get_source_database_name() = 'STR11LCY.US.ORACLE.COM')) and (dml.get_compatible() <=`

Associated Transformation

Custom Rule Based Transformation

Declarative Rule Based Transformation

Add

Select Declarative Type	Step Number	Description
No items found		

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

Related Links

[Create PL/SQL Functions](#)

Database Instance: STR11LCY\_stajo01.us.oracle.com > Logged in As STREAMSADMIN

### Add Transformation: Rename Schema

Rule Name: TEST1160

From Schema Name:

To Schema Name:

Step Number:  Specify the step number to override the default declarative transformation ordering

# Automatic Transformations

- Adding a transformation to a rule is simple with Enterprise Manager. This example shows renaming the schema from TEST1 to an existing schema called OAK. Use the pull-down menu under Declarative Rule Based Transformation to choose an Oracle supplied transform for DML. In this case – to rename a schema. Click on Go. The Add transformation: Rename Schema page comes up prompting for the OLD (FROM) and NEW (TO) schema names. Use the step number to reconfigure the order in which transformations are performed. See the Streams documentation for further information on ordering of transformations.
- The list of all declarative transformations for a rule are visible on the EDIT RULE page (this page – left hand graphic)
- Custom transformations are pl/sql functions provided by the user. These can be registered to a particular rule using the Custom Rule Based Transformation block.

# 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](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

# Streams Resources

- These resources are available for further information about Oracle Streams and Best Practices. The MyOracle Support Note 784021.1 is specific to 10.2.0.5 Grid Control and Streams. Please review this note to obtain the Streams Performance Advisor patch that enables monitoring of 10g database.

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