

ORACLE 11G DATABASE STATISTICS

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OVERVIEW

Oracle 10g have made lots of significant change so as to provide good performance to Oracle database. The important changes includes

1. Collect Statistics on Dictionary tables
 - a. Fixed or in-memory tables such as x\$ tables
 - b. Real or normal tables
2. Added new values to the arguments to DBMS_STATS package
 - a. New value to GRANULARITY argument
 - i. AUTO
 - ii. GLOBAL_PARTITION
 - b. New value to DEGREE parameter
 - i. AUTO_DEGREE
3. Enable Automatic DML monitoring

In Oracle 11g, there are several new changes been made to simplify DBA tasks as well as benefit the application users. The important changes includes

1. **Setting statistics preferences.**

Oracle 10g has introduced Automatic Statistics Gathering job that collect Statistics daily in the evening for Oracle Optimizer. But if we need to collect statistics on some table(s) with different setting, then the only options is lock the Statistics for these table(s) and then analyze them using our own scripts and settings. This will add more complexity to the setup, as we may need to create several jobs based on our environment.

Oracle 11g has provided Statistics preferences feature which will allow to override the default behavior of GATHER_*_STATS at Schema as well as Object level. With this option, we can define preferences on Database/Schema/Object level so that Automatic Statistics Gathering Job can override the default Statistics gathering settings and will automatically inherit the new preferences

2. **Private Statistics**

Oracle 11g allows DBMS_STATS to gather Stats in Private area instead of storing in Data Dictionary. This way Oracle Optimizer continue to work with stats collected in Data Dictionary until you are done in validating the new Stats collected in Private area.

3. **Publishing Private Statistics**

When you are done with validating the new stats generated by DBMS_STATS and stored in Private area, then you can make it permanent by moving it to Data Dictionary.

4. **Multicolumn statistics**

You can now create the extended statistics on group of columns that are correlated to each other. This will improve the query performance.

5. **Expression statistics**

Similar to extended statistics on group of columns, we can also create the stats on expression. This way we can bypass the Functional index.

6. **Incremental Statistics**

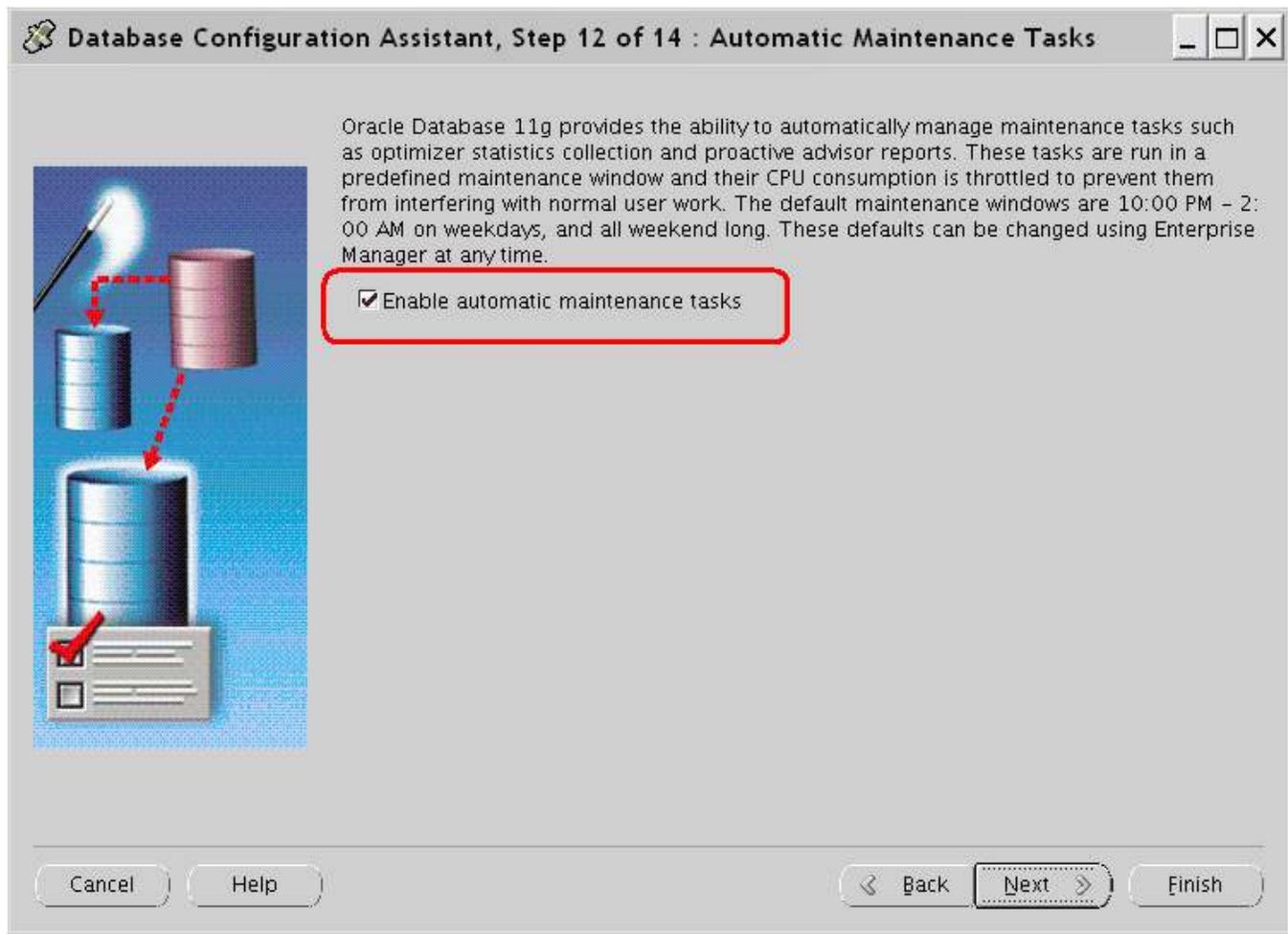
If the Table is partitioned, then Oracle will maintain statistics on each partition as well as global partition for entire table. If the data in old partitions are not changed so often, still Oracle collect the Global Statistics for the entire table and it can be expensive for big partition that reside on slow devices. In order to overcome this issue, Oracle 11g has introduced Incremental statistics

that will maintain the global statistics of all partition which are unchanged using new data structure synopses stored in SYSAUX tablespace. Setting INCREMENTAL preferences as TRUE for partition table will allow Oracle to collect global and partition level statistics for only those partitions which are changed since last statistics collection process.

11g AUTOMATIC DATABASE STATISTICS JOB SETUP

Step 1: During Oracle Database Creation using DBCA, you will see the new Screen that will prompt you to setup the Automatic Maintenance Tasks. Earlier in 10g, there is one Database Statistics Gathering Job which will be created automatically when database is created using DBCA. In 11g, this Automatic Maintenance Task will enable the following 3 jobs

1. Optimizer Statistics Gathering – I will only discuss this in this paper
2. Segment Advisor
3. Automatic SQL Tuning



Step 2: Logon to the Enterprise Manager Database Console and then click on **Server** and go to **Manage Optimizer Statistics** under **Query Optimizer** Tab.

Database Instance: orcl

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Change Database

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Step 3: Click on **Automated Maintenance Tasks** as shown below to make any change in the setup

ORACLE Enterprise Manager 11g Database Control

Database Instance: orcl >

Manage Optimizer Statistics

Database **orcl**

Optimizer Statistics are used by the query optimizer performance of SQL statements.

Operations

- [Gather Optimizer Statistics](#)
- [Restore Optimizer Statistics](#)
- [Lock Optimizer Statistics](#)
- [Unlock Optimizer Statistics](#)
- [Delete Optimizer Statistics](#)

Related Links

- [Object Statistics](#)
- [Global Statistics Gathering Options](#)
- [Object Level Statistics Gathering Preferences](#)
- [Job Scheduler](#)
- [Automated Maintenance Tasks](#)

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Step 4: You can enable it if it was not done during DBCA database Creation process by selecting **Enabled** Radio Button and then click **Apply**

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

Database Instance: orcl > Automated Maintenance Tasks > Logged in As SYS

Automated Maintenance Tasks Configuration

Global Status Enabled Disabled

Task Settings

Optimizer Statistics Gathering Enabled Disabled

Segment Advisor Enabled Disabled

Automatic SQL Tuning Enabled Disabled

Individual Task Configuration

Maintenance Window Group Assignment

Window	Optimizer Statistics Gathering	Segment Advisor	Automatic SQL Tuning
	Select All Select None	Select All Select None	Select All Select None
FRIDAY_WINDOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SATURDAY_WINDOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SUNDAY_WINDOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MONDAY_WINDOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
TUESDAY_WINDOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
WEDNESDAY_WINDOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
THURSDAY_WINDOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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This is equivalent to SQL command shown below

```

BEGIN
  dbms_auto_task_admin.enable ();
END;

```

Step 5: When you select **ENABLED**, it will enabled all of the Task defined for Automated Maintenance as shown below

Database Instance: orcl > Automated Maintenance Tasks >

Logged in As SYS

[Show SQL](#) [Revert](#) [Apply](#)

Automated Maintenance Tasks Configuration

Global Status Enabled Disabled

Task Settings

- Optimizer Statistics Gathering Enabled Disabled [Configure](#)
- Segment Advisor Enabled Disabled
- Automatic SQL Tuning Enabled Disabled [Configure](#)

Maintenance Window Group Assignment

[Edit Window Group](#)

Window	Optimizer Statistics Gathering	Segment Advisor	Automatic SQL Tuning
	Select All Select None	Select All Select None	Select All Select None
FRIDAY_WINDOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SATURDAY_WINDOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SUNDAY_WINDOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
MONDAY_WINDOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
TUESDAY_WINDOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
WEDNESDAY_WINDOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
THURSDAY_WINDOW	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

[Show SQL](#) [Revert](#) [Apply](#)

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Step 6: Now we can configure the Default Setting for Optimizer Statistics by selecting **Configure** button available in front of **Optimizer Statistics Gathering** Task. You will see the below screen and I had highlighted each setting with the Argument passed to DBMS_STATS package

ORACLE Enterprise Manager 11g Database Control

Setup Preferences Help Logout Database

Database Instance: orcl > Manage Optimizer Statistics > Logged in As SYS

Global Statistics Gathering Options

Database **orcl** Cancel Show SQL Apply

Statistics History

Retention Period (days)
The number of days for which optimizer statistics history will be retained.

Gather Optimizer Statistics Default Options

Oracle recommends that you use the Gather Auto choice for the Gather Objects options when you use the Gather Optimizer Statistics process for Database and Schemas. If you choose not to use Gather Auto, the defaults for the other options are set here. Changing the options will impact the automated Optimizer Statistics Gathering task and user defined jobs. Reset Defaults

ESTIMATE_PERCENT Estimate Percentage Auto (Oracle recommended) 100% Percentage

DEGREE Degree of Parallelism Table default Auto System default Degree

GRANULARITY Granularity

NO_VALIDATE Cursor Invalidation Auto (Oracle recommended) Immediate None

CASCADE Cascade Auto (Oracle recommended) True False
Target Object Class (Auto Job) Auto (Oracle recommended) All Oracle

STALE_PERCENT Stale Percentage

INCREMENTAL Incremental True False

PUBLISH Publish True False

Histograms

Cancel Show SQL Apply

Database | Setup | Preferences | Help | Logout

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Step 7: You can also see that Automated Maintenance Job is scheduled to run daily with the following schedule

1. Between 10pm - 2am on weekdays and
2. Between 6am – 2am on Weekend

Database Instance: orcl >

Logged in As SYS

Automated Maintenance Tasks

Status **Enabled** [Configure](#)

Collected from Target **Aug 3, 2007 2:21:46 PM EDT**

TIP If the status is Disabled, there are no future windows.

* Begin Date Interval
(example: Aug 3, 2007)

