

Oracle Enterprise Manager Oracle Database and Application Testing

# **Data Masking Lab**

Session S318966





# Oracle Enterprise Manager 11g Data Masking Hands-on Lab

### Introduction to Enterprise Manager 11g

<u>Oracle Enterprise Manager 11g</u> is the centerpiece of Oracle's integrated IT management strategy, which rejects the notion of management as an after-thought. At Oracle, we design manageability into each product from the start, enabling Oracle Enterprise Manager to then serve as the integrator of manageability across the entire stack encompassing Oracle and non-Oracle technologies. Fueled by this unique vision, Oracle Enterprise Manager 11g has introduced *business-driven IT management* to help IT deliver greater business value through three highly differentiated capabilities:

- <u>Business-driven application management</u>, which combines industry-leading capabilities in real user experience management, business transaction management and business service management to improve application users' productivity while enhancing business transaction availability
- <u>Integrated application-to-disk management</u>, which provides deep management across the entire Oracle stack to reduce IT management complexity and eliminate disparate point tools
- <u>Integrated systems management and support</u>, which utilizes industry-first technology bring support services into the IT management console; enabling proactive IT administration, increased application and system availability, and improved customer satisfaction

#### Introduction to Enterprise Manager 11g Data Masking Pack

<u>Oracle Data Masking pack for Enterprise Manager</u>, part of Oracle's comprehensive portfolio of database security solutions, helps organizations comply with data privacy and protection mandates such as Sarbanes-Oxley, Payment Card Industry (PCI) Data Security Standard (DSS), Health Insurance Portability and Accountability Act (HIPAA), as well as numerous laws that restrict the use of actual customer data. With Oracle Data Masking, sensitive information such as credit card or social security numbers can be replaced with realistic values, allowing production data to be safely used for development, testing, or sharing with out-source or off-shore partners for other non-production purposes.

- **Comprehensive and Extensible Mask Library** --Oracle Data Masking Pack provides a centralized library of out-of-the-box mask formats for common types of sensitive data, such as credit card numbers, phone numbers, national identifiers..
- Sensitive Data Discovery and Application Integrity -- Using Oracle Data Masking Pack's search capabilities, information security administrators can quickly search the database to identify sensitive data. In some applications, the same sensitive data is maintained in multiple tables related by referential (primary key-foreign key) relationships. Oracle Data Masking Pack discovers these relationships and masks all related data elements automatically while preserving referential relationships.
- Sophisticated Masking Techniques -- Oracle Data Masking Pack provides a variety of sophisticated masking techniques to meet application requirements while ensuring data privacy: Condition-based masking which makes it possible to apply different mask formats to the same data set depending on the rows that match the conditions, Compound masking which ensures that a set of related columns is masked as a group to ensure that the masked data across the related columns retain the same relationship, and Deterministic masking which ensures repeatable masked values after a mask run. Enterprise may use this technique to ensure that certain values get masked to the same value across all databases.

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- Secure High Performance Mask Execution -- Unlike traditional masking processes that are typically slow, Oracle Data Masking Pack uses highly efficient parallelized bulk operations to replace the original sensitive data with masked data. Because the entire data masking process is done in place, enterprises can be assured of a greater sense of security knowing that the sensitive data would never leave the database during the masking process.
- Support for Heterogeneous Databases: Oracle Data Masking Pack can support masking of data in heterogeneous databases, such as IBM DB2 and Microsoft SQLServer, through the use of Oracle Database Gateways.

#### This lab will demonstrate:

- Creating and exporting data masking formats
- Masking sensitive application data
- Using compound masking, condition-based masking and user defined masking
- (OPTIONAL)Deterministic masking

Please feel free to seek assistance from the instructor or Oracle Demo staff at any point in time.

Before we start taking you through the demonstration, please note the following:

• You will be given a virtual machine address to use for this lab. For ease of reference, you may want to write this below:

Virtual Machine Address: \_

- You will connect to that system using VNC. VNC password is g0Oracle12#
- Operating System Accounts:

Database(db04 and db05) Accounts:

• Grid Control Accounts:

<u>system/oracle1</u> sysman/oracle1

oracle/g0Oracle12# and root/g0Oracle12#

Additional information can be found at: Demo Booths located at {Location} Additional Sessions: Moscone South: Enterprise Manager # XXXX Moscone West: Enterprise Manager # XXXX

For additional information, visit:

Oracle Enterprise Manager http://www.oracle.com/enterprise\_manager/index.html



## Creating and exporting data masking formats

- 1. Start Firefox and login to Grid Control as **sysman/oracle1** at the URL http://dbsecurity.oracle.com:4889/em.
- 2. Navigate to TARGETS->DATABASES-> Data Masking Format Library

| ORA<br>Grid C | CLE Enterpri   | se Manager 📃   |                 |                   | Home Targets            | Deployments        | Alerts Con    | npliance Jobs      | Reports M       | Preferences Help Logou<br>My Oracle Support |
|---------------|--|----------------|-----------------|-------------------|-------------------------|--------------------|---------------|--------------------|-----------------|---|
| Hosts         | Databases  | Middleware   W | eb Applications | Services   System | s   Groups   Virtual Se | ervers   All Targe | its           |                    |                 |   |
| Data          | ibases   |                |                 |                   |                         |                    |               |                    |                 |   |
| View          | View 🔿 Oracle Load Map 🐵 Search List Page Refreshed 🛛 Jul 27, 2010 5:18:48 PM UTC 🖺  |                |                 |                   |                         |                    |               |                    |                 |   |
| Targe         | Targets Not Configured 1   |                |                 |                   |                         |                    |               |                    |                 |   |
| Searc         | Search Co Advanced   |                |                 |                   |                         |                    |               |                    |                 |   |
| Re            | move Configu   | re   Add       |                 |                   |                         |                    |               |                    |                 |   |
| Selec         | at Name ∕_   | Status         | Alerts          | Policy Violations | Compliance Score (%)    | Version            | Sessions: CPU | Sessions: I/O      | Sessions: Other | Instance CPU (%)                            |
| ۲             | av.oracle.com  | 4              |                 | 1 25 3            | 99                      | 10.2.0.3.0         |               |                    |                 |   |
| 0             | db01.oracle.com  |                |                 | <u>5 28 6</u>     | 98                      | 11.1.0.7.0         |               |                    |                 |   |
| 0             | db02.oracle.com  |                |                 | <u>5</u> 26 2     | 98                      | 11.1.0.7.0         |               |                    |                 |   |
| 0             | db03.oracle.com  |                |                 | 1 26 3            | 99                      | 10.2.0.4.0         |               |                    |                 |   |
| 0             | db04.oracle.com  | Û              | Q Q             | <b>0</b> 0 0      | -                       | 11.2.0.1.0         | -             | - 🧹                | - 🧳             | -   |
| 0             | db06.oracle.com  |                |                 | <b>0</b> 0 0      | -                       | 11.2.0.1.0         |               |                    |                 |   |
| 0             | emrep.oracle.co  | <sup>m</sup> 🗘 | 1 4             | <u>15 69 5</u>    | 92                      | 10.2.0.4.0         | <u>.01</u>    | .01 🛷              | Q 🗸             | .44   |
| © ⊤if         | TIP For an explanation of the icons and symbols used in this page, see the Icon Key, |                |                 |                   |                         |                    |               |                    |                 |   |
| RI CI         | erateo LINKS   | lumno          |                 | Data Mac          | king Definitions        |                    | Data I        | looking Format Lib | 10.04           |   |
| Di            | ctionary Baselines   | <u>numinis</u> |                 | Dictionary        | Comparisons             |                    | Diction       | ary Synchronizatio | ns              |   |
| Ex            | ecute SQL  |                |                 | Recovery          | Catalogs                |                    |               |                    | _               |   |

3. The format library contains a collection of ready-to-use masking formats. The library consists of format routines that you can use for masking. A masking format can either be one that you create, or one from the list of Oracle-supplied default masking formats.

| osts   Databases   Middleware   Web Applica        | tions   Services   S | lystems   Groups   Virtual  | Servers   All Targets  | y or acre suppo |
|--|----------------------|-----------------------------|--|-----------------|
| ata Masking Definitions >                          |                      |                             |  |                 |
| ormat Library                                      |                      |                             |  |                 |
| e Format Library contains a collection of ready-to | -use masking formats | which can be used when crea | ating a masking definition.                                    |                 |
| arch Format 🖨                                      | Go                   | )                           | (Export)   | mport) Crea     |
| View)(Create Like)(Edit)(Delete)                   |                      |                             | Previous 1-25 of 2   | 27 \$ Next 2    |
| elect Format                                       | Data Type            | Sample                      | Description  | Owner           |
| Anglo American First Name                          | Source Type          | Not Generated               | Anglo American First Name                                      | SYSMA           |
| O Anglo American Last Name                         | Source Type          | Not Generated               | Anglo American Last Name                                       | SYSMA           |
| Bay Area Phone Number                              | Character            | (650) 555-4301              | Bay Area Phone Number  | SYSMA           |
| Social Security Number                             | Character            | 519801035                   | Social Security Number   | SYSMA           |
| O Social Security String                           | Character            | 565-76-3244                 | Social Security String   | SYSMA           |
| Expiration Date                                    | Date                 | 2014-03-31 18:04:46.0       | Expiration Date  | SYSMA           |
| New Hampshire Phone Number                         | Character            | (603) 863-8404              | New Hampshire Phone Number                                     | SYSMA           |
| Visa / Master Card Number                          | Character            | 4985-2247-7415-5672         | Visa / Master Card Number                                      | SYSMA           |
| Credit Card Number With Checksum                   | Character            | Not Generated               | Dummy credit card numbers based on original type with checksum | SYSMA           |
| American Express Credit Card Number                | Character            | 3773463270140352            | ~10 billion unique American Express credit card numbers        | SYSMA           |
| O Discover Card Credit Card Number                 | Character            | 6011707805960238            | ~10 billion unique Discover Card credit card numbers           | SYSMA           |
| MasterCard Credit Card Number                      | Character            | 5441195343423350            | ~10 billion unique MasterCard credit card numbers              | SYSMA           |
| Visa Credit Card Number                            | Character            | 4716903976365199            | ~10 billion unique Visa credit card numbers                    | SYSMA           |
|  |                      |                             |  |                 |

4. Click on the Create button to begin creating a custom Masking Format.

| Data Masking Definitions >   |                      |
|--|----------------------|
| Format Library   |                      |
| The Format Library contains a collection of ready-to-use masking formats which can be used when creating a masking definition. |                      |
| Search Format 🗘 🕜  | Export Import Create |



5. From the Create Format Dialog, we will configure our Masking Format

|                                | • Name                 |                      |                  |              |                 |               |                   |           |                     |             |         | _ |  |
|--------------------------------|------------------------|----------------------|------------------|--------------|-----------------|---------------|-------------------|-----------|---------------------|-------------|---------|---|--|
|                                | Description            |                      |                  |              |                 |               |                   |           |                     |             |         |   |  |
| Format Entries                 |                        |                      |                  |              |                 |               |                   |           |                     |             |         |   |  |
| Define masking format by a     | adding one or mon      | e format entries     | of different typ | pes.         |                 |               |                   |           |                     |             |         |   |  |
|                                |                        |                      |                  |              |                 |               |                   | Add       | Array List          | ;           | GO      |   |  |
| Туре                           | Description            |                      |                  |              |                 |               |                   |           | Edit                | Ren         | iove    |   |  |
| No entries added               |                        |                      |                  |              |                 |               |                   |           |                     |             |         |   |  |
| Add atleastone immatenity in u | e post processing Lung | ion.                 |                  |              |                 |               |                   |           |                     |             |         |   |  |
| Post Processing Function       |                        |                      |                  |              |                 |               |                   |           |                     |             |         |   |  |
|                                | The function can eithe | r be a standalone fu | iction (Example: | : scottmaski | king_lunc) or a | a function sp | ecified inside of | a padkage | (Example: scottmask | ing_pkg.che | disum). |   |  |
| Sample Masked Data             |                        |                      |                  |              |                 |               |                   |           |                     |             |         |   |  |
| Samples are generated us       | ing defined format     | Use Refresh to       | re-generate      | (            | Refresh         |               |                   |           |                     |             |         |   |  |

| Name:        | Colors              |
|--------------|---------------------|
| Description: | Colors of a rainbow |

6. Type 'Colors' in the Name field and 'Colors of a rainbow' in the Description Field. Before adding a field type, view the number of different options which you can mask data. Choose Array List and click the Go button.

| Add                       | Array List             | Go   |
|---------------------------|------------------------|------|
|                           | Array List             | V N  |
|                           | Delete                 |      |
| • • • • • • • • • • • • • | Fixed Number           |      |
|                           | Fixed String           |      |
|                           | Null Value             |      |
|                           | Preserve Original Data |      |
| le of a package (         | Random Dates           | um). |
|                           | Random Digits          |      |
|                           | Random Numbers         |      |
|                           | Random Strings         |      |
|                           | Shuffle                |      |
|                           | Substitute             |      |
|                           | Substring              |      |
|                           | Table Column           |      |
| orts   <u>Setup</u>       | Truncate               | jout |
|                           | User Defined Function  |      |
|                           |                        | -    |

- 7. Define the List of Values for the Colors Format and click on the OK button when finished. The values include:
  - Red, Orange, Yellow, Green, Blue, Indigo, Violet

| Create Format           |                    |  |   |
|-------------------------|--------------------|--|---|
| Array List              |                    |  | Cancel OK   |
| Specify a list of value | s. Use ',' to sepa | rate each value in the list. Leading and trailing white spaces will be ren                       | noved. The values in the list will be selected randomly to mask the original column values. |
|                         | List of Values     | Red, Orange, Yellow, Green, Blue, Indigo, Violet<br>Example: New York, New Jersey, New Hampshire |   |

8. You can see samples of the masked data in the Sample Masked Data Section. Click on the Refresh button to see a random sample from the defined Array List. This screen allows you to edit any values of the Masking Format. Click the OK button when you are satisfied with the entries.





| dit Format: C  | Colors                  |  |                         |             |                       |                       |
|----------------|-------------------------|--|-------------------------|-------------|-----------------------|-----------------------|
|                |                         |  |                         |             |                       | (Cancel) (C           |
|                | * Name                  | Colors   |                         |             |                       |                       |
|                | Description             | Colors of a rainbow  |                         |             |                       |                       |
|                |                         |  |                         |             |                       |                       |
| Format Entri   | ies                     |  |                         |             |                       |                       |
| Define masking | g format by ad          | ding one or more format entries of differe   | ent types.              |             |                       |                       |
|                |                         | Add  | Array List              |             | GO                    |                       |
| Туре           | Descrip                 | otion  |                         | Edit        | Remove                |                       |
| Array List     | List of \               | /alues: Blue,Green,Indigo,Orange,Red,V   | /iolet,Yellow           | 8           |                       |                       |
| Post Processir | ng Function             |  |                         |             |                       |                       |
|                |                         | The function can either be a standalone functior<br>package (Example: scott.masking_pkg.checksur | n (Example: scot<br>n). | t.masking_f | func) or a function s | specified inside of a |
| Sample Mas     | ked Data                |  |                         |             | _                     |                       |
| Samples are g  | enerated usin           | g defined format. Use Refresh to re-gene   | erate samples           | Refres      | :h)                   |                       |
|                | • Re                    | d  |                         |             |                       |                       |
|                | Ora                     | ange   |                         |             |                       |                       |
|                | <ul> <li>Blu</li> </ul> | ie   |                         |             |                       |                       |
|                | <ul> <li>Gre</li> </ul> | een  |                         |             |                       |                       |
|                | <ul> <li>Ind</li> </ul> | ligo   |                         |             |                       |                       |

9. Return to the Format Library screen and click on the Export button to begin the process of exporting the entire library.

| Data Masking Definitions >   |                      |
|--|----------------------|
| Format Library   |                      |
| The Format Library contains a collection of ready-to-use masking formats which can be used when creating a masking definition. |                      |
| Search Format 🗘 🕜  | Export Import Create |

10. As the dialog states, exporting a format mask can be saved and re-used in the future for masking. This mask can be shared and/or imported into another Format Library in another Enterprise Manager environment.

| Export Format Library   |                |
|---|----------------|
| A saved format libray can be reused in the future for masking. It allows sharing of masking formats with other Enterprise Manager environments that use a different repository. | Cancel Export) |

11. Save the file to the default location on the Desktop.

| from: http://dbsecurity.oracle.com:4889<br>Vhat should Firefox do with this file?<br>Ogpen with Firefox Web Browser (default)<br>Save File<br>Do this automatically for files like this from now on. | masking_fmt_l        | lib_200905122009.xml                        |
|--|----------------------|---|
| Vhat should Firefox do with this file?         Open with       Firefox Web Browser (default)         Save File         Do this automatically for files like this from now on.                        | from: http://dbse    | ecurity.oracle.com:4889                     |
| Open with Firefox Web Browser (defauit)     Save File     Do this automatically for files like this from now on.   | /hat should Fir      | efox do with this file?                     |
| <ul> <li>Save File</li> <li>Do this <u>a</u>utomatically for files like this from now on.</li> </ul>   | O Open with          | Firefox Web Browser (default)               |
| Do this automatically for files like this from now on.   | () Save File         |   |
|  | Do this <u>a</u> uto | omatically for files like this from now on. |
|  |                      |   |
|  |                      |   |

12. Navigate to the Desktop and double-click on the newly created XML document. Your filename will be different than what has been captured here.







13. If you would like to, you can review the XML document and the information that has been captured in the document.

| Mozilla Firefox   |              |   |
|---|--------------|---|
| <u>File E</u> dit <u>V</u> iew Hi <u>s</u> tory <u>B</u> ookmarks <u>T</u> ools <u>H</u> elp                      |              |   |
| 💠 💠 👻 🔞 🔞 🐻 file:///home/oracle/Desktop/masking_fmt_lib_200905122009.xml  | 😭 🔻 🕼 Google | 2 |
| 🗟 Most Visited ▼ 🛛 🗟 Audit Vault 📓 Grid Control 🖉 DB01 EM   |              |   |
| Oracle Enterprise Manager ( × ) file:///home/905122009.xml ×  |              | • |
| This XML file does not appear to have any style information associated with it. The document tree is shown below. |              | = |
| <pre></pre>   |              | Ē |



## **Masking Sensitive Application Data**

- RACLE Enterprise Manager nts Alerts Compliance Jobs Reports My Oracle Support Targets Depl Databa ees Mide Databases View 🔿 Oracle Load Map 💿 Search List ed Jul 27, 2010 5:18:48 PM UTC 🔃 Targets Not Configured 1 Go Advanced Search Search Remove Configure Add Select Name 🛆 Alerts Policy Violations Compliance Score (%) Version ns: CPU Sessions: I/O Sessions: Other Instance CPU (% Status av oracle.com 1 25 3 99 10.2.0.3.0 db01.oracle.com 98 11.1.0.7.0 5 28 6 8 o db02.oracle.com 98 11.1.0.7.0 5 25 2 4 db03.oracie.com 4 1 29 2 99 10.2.0.4.0 O db04.omc/e.com 000 - 11.2.0.1.0 <u>ن</u> db06.oracle.com - 11.2.0.1.0 000 4 emrep oracle com .01 Ŷ 15 69 5 92 10.2.0.4.0 .01 TIP For an explanation see the <u>loon Key</u>. **Related Links** Data Masking Definitions Dictionary Comparisons Customize Table Columns Data Masking Format Library Dictionary Baselines Dictionary Synchronizations Execute SQL Recovery Catalogs
- 2. From the Data Masking Definitions Dialog, we will create a new definition. Click on the Create button to begin the process of masking data.

| Data Masking Definitions   |   |   |   |  |
|--|---|---|---|--|
| Data masking is the process of making ser<br>masking definition defines the columns to b<br>a collection of ready-to-use masking forma | sitive information in test or no<br>e masked and the format of r<br>ts. | n-production databases safe. It de<br>nasked data. You can create a ner | squises sensitive information by overw<br>w masking definition or use an existing | riting it with realistic looking but false data of a similar type. A<br>g definition for a masking operation. The Format Library contain |
| Search Masking Definition  |   |   |   | (Import) (Create   |
| Select Masking Definition  | Database  | Description   | ColumnsStatus   | Most Recent Job Ended  |
| No definitions   |   |   |   |  |
| Format Library   |   |   |   |  |
| A masking format defines the format of   | masked data. You can create   | e a new masking format and reuse  | it later when creating a masking defin  | nition.  |
| Format Library   |   |   |   |  |

- 3. From the Create Masking Definition screen, type in the Name, Database and Description field with the provided values below. Continue and click on the Add button.
  - i. Name: SIMPLE\_EMPLOYEE\_DATA\_MASK Database: db04.oracle.com Description: Mask Employee Data

| onto I  | Maeking Defi       | nition                         |                            |                                |                             |               |                           |                |         |
|---------|--------------------|--------------------------------|----------------------------|--------------------------------|-----------------------------|---------------|---------------------------|----------------|---------|
| eater   | Masking Den        | inton                          |                            |                                |                             |               |                           | Cana           |         |
|         |                    | * Name                         | SIMPLE EMPLOYEE D          | ATA MASK                       | Ì                           |               |                           | Cance          |         |
|         |                    |                                |                            |                                |                             |               |                           |                |         |
|         |                    | * Database                     | db04.oracle.com            |                                |                             | <i>ॅ</i>      |                           |                |         |
|         |                    | Description                    | Mask Employee Data         |                                |                             |               |                           |                |         |
| Colum   | ins                | +                              |                            |                                |                             |               |                           |                |         |
| Add col | lumns you want to  | mask and define masking        | format for each column. Fe | oreign key columns are auto    | matically added to maintain | referential i | ntegrity. Dependent colum | ns are columns |         |
| that do | not have foreign k | ey constraints defined, but    | t reference a masked colur | nn due to application level or | onstraints. You can manual  | y add depen   | dent columns to a masked  | column.        |         |
| Remov   | ing a column from  | this list will remove all fore | ign key and dependent col  | umns.                          |                             |               |                           |                | Ad      |
|         |                    |                                |                            |                                |                             |               |                           | Dependent C    | Columns |
| Select  | Owner              | Table                          | Column                     | Column Group                   | Data Type                   | Format        | Foreign Key Columns       | Count          | Add     |
|         | No columns         |                                |                            |                                |                             |               |                           |                |         |
|         | addad              |                                |                            |                                |                             |               |                           |                |         |

4. At the Database Login screen, login as system/oracle1. Leave "Connect As" set to Normal, and then click the Login button.

1. Navigate to the Data Masking Definitions by selecting **Targets** -> **Databases** -> **Data Masking Definitions**.

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| Database Login               |
|------------------------------|
| Username system              |
| Password                     |
| Database db04.oracle.com     |
| Connect As Normal            |
| Save as Preferred Credential |
| (Cancel) (Login)             |

5. We are going to search for the EMPLOYEES table in the HR Schema. Type in the following values and click on the Search button.

| Schema:         | HR       |
|-----------------|----------|
| Table Name:     | EMPLOYEE |
| Column Comment: | MASK%    |

| Data Masking Definition  | Data Masking Definitions > Create Masking Definition > |             |              |                                   |        |                               |  |  |  |  |  |  |
|--|--|-------------|--------------|-----------------------------------|--------|-------------------------------|--|--|--|--|--|--|
| Add Columns  | Add Columns  |             |              |                                   |        |                               |  |  |  |  |  |  |
|  | Database db04.or                                       | cle.com     |              | Logged In As system               | Cancel | Add Define Format And Add     |  |  |  |  |  |  |
| dd one or more columns for masking. Foreign key columns will be added automatically. You can define masking format at once for all selected columns if they have the same data type. |  |             |              |                                   |        |                               |  |  |  |  |  |  |
| Search   | Search   |             |              |                                   |        |                               |  |  |  |  |  |  |
| Schema   | HR   |             | 🧳 🛛 Column N | ame                               |        | ]                             |  |  |  |  |  |  |
| Table Name   | EMPLOYEES  |             | Column Comr  | ment MASK%                        |        | ]                             |  |  |  |  |  |  |
|  | Search   |             |              | Enter a string in column comments | L.     | ~                             |  |  |  |  |  |  |
| Mask selected  | d columns as a group                                   |             |              |                                   |        |                               |  |  |  |  |  |  |
| Select Owner   | Table Name   | Column Name | Data Type    | Comment                           |        |                               |  |  |  |  |  |  |
| No column  | าร   |             |              |                                   |        |                               |  |  |  |  |  |  |
|  |  |             |              |                                   | Cancel | (Add) (Define Format And Add) |  |  |  |  |  |  |

6. Select the column for EMPLOYEE\_ID and click the Add button.

| Ma     | Ask selected columns as a group |            |             |               |  |                                      |  |  |  |  |  |  |  |
|--------|---------------------------------|------------|-------------|---------------|--|--------------------------------------|--|--|--|--|--|--|--|
| Select | Select All   Select None        |            |             |               |  |                                      |  |  |  |  |  |  |  |
| Select | t Owner                         | Table Name | Column Name | Data Type     | Comment                                |                                      |  |  |  |  |  |  |  |
|        | HB.                             | EMPLOYEES  | EMAIL       | VARCHAR2(100) | MASK candidate: HR Privacy Policy      |                                      |  |  |  |  |  |  |  |
|        | HR.                             | EMPLOYEES  | EMPLOYEE_ID | NUMBER        | MASK candidate: HR Benefits Policy     |                                      |  |  |  |  |  |  |  |
|        | HR.                             | EMPLOYEES  | FIRST_NAME  | VARCHAR2(20)  | MASK candidate: HR Privacy Policy      |                                      |  |  |  |  |  |  |  |
|        | HR.                             | EMPLOYEES  | LAST_NAME   | VARCHAR2(25)  | MASK candidate: HR Privacy Policy      |                                      |  |  |  |  |  |  |  |
|        | HR.                             | EMPLOYEES  | SALARY      | NUMBER(8,2)   | MASK candidate: HR Compensation Policy |                                      |  |  |  |  |  |  |  |
|        |                                 |            |             |               | (                                      | Cancel) (Add) (Define Format And Add |  |  |  |  |  |  |  |

7. Notice how all associated foreign key columns (5) were added automatically to this Masking Definition. However, in this particular case, there is an additional table named MANAGERS that is part of the HR application, but all of its constraints are enforced by the application and NOT in the database. The MANAGERS table uses EMPLOYEE\_ID, but the relationship is not registered in the database as a foreign key constraint. Therefore, we must add a Dependent column on the EMPLOYEE\_ID column. Click on the I icon to add this Dependent Column

| 1 | Information   |
|---|---|
|   | Foreign key columns were added and will be masked the same way as parent columns.   |
|   | HR.EMPLOYEES.EMPLOYEE_ID - HR.DEPARTMENTS.MANAGER_ID; HR.EMPLOYEES.MANAGER_ID; HR.JOB_HISTORY.EMPLOYEE_ID; OE.CUSTOMERS.ACCOUNT_MGR_ID; |
|   | OE.ORDERS.SALES_REP_ID  |



| Ren                                     | move                                 |  |   |                                    |   |        |  |                             |        |
|---|--------------------------------------|--|---|------------------------------------|---|--------|--|-----------------------------|--------|
| Select                                  | t All   Select No                    | l <u>e</u>   |   |                                    |   |        | Foreign Key  | Dependent C                 | olumns |
| Select                                  | t Owner                              | Table  | Column  | Column Group                       | Data Type   | Format | Columns  | Count                       | Add    |
|   | HR                                   | EMPLOYEES  | EMPLOYEE_ID   |                                    | NUMBER  | k      | 5  | 0                           | ÷      |
| Forei                                   | ign Key Colur                        | ins  |   |                                    |   |        |  |                             |        |
| Fore is<br>Owne                         | ign Key Colur<br>r T                 | ins<br>ible  | Column  | Parent Own                         | er Parent Table   |        | Parent Col   | umn                         |        |
| Fore is<br>Owne<br>HR                   | ign Key Colur<br>r T<br>D            | INS<br>Ible<br>EPARTMENTS                                      | Column<br>MANAGER_ID  | Parent Own<br>HR                   | er Parent Table<br>EMPLOYEES  |        | Parent Col<br>EMPLOYEE                                     | umn<br>_ID                  |        |
| Foreig<br>Owne<br>HR<br>HR              | ign Key Colur<br>r T<br>D<br>E       | IDE<br>EPARTMENTS<br>MPLOYEES                                  | Column<br>MANAGER_ID<br>MANAGER_ID                                  | Parent Own<br>HR<br>HR             | EMPLOYEES<br>EMPLOYEES  |        | Parent Col<br>EMPLOYEE<br>EMPLOYEE                         | umn<br>E_ID<br>E_ID         |        |
| Foreig<br>Owner<br>HR<br>HR<br>HR       | ign Key Colur<br>r T<br>D<br>E<br>J  | INS<br>IDDE<br>EPARTMENTS<br>MPLOYEES<br>DB_HISTORY            | Column<br>MANAGER_ID<br>MANAGER_ID<br>EMPLOYEE_ID                   | Parent Own<br>HR<br>HR<br>HR       | EMPLOYEES<br>EMPLOYEES<br>EMPLOYEES<br>EMPLOYEES                    |        | Parent Col<br>EMPLOYEE<br>EMPLOYEE<br>EMPLOYEE             | umn<br>ID<br>ID             |        |
| Foreig<br>Owner<br>HR<br>HR<br>HR<br>OE | ign Key Colur<br>ir T<br>E<br>J<br>C | INS<br>IDE<br>EPARTMENTS<br>MPLOYEES<br>NB_HISTORY<br>JSTOMERS | Column<br>MANAGER_ID<br>MANAGER_ID<br>EMPLOYEE_ID<br>ACCOUNT_MGR_ID | Parent Own<br>HR<br>HR<br>HR<br>HR | er Parent Table<br>EMPLOYEES<br>EMPLOYEES<br>EMPLOYEES<br>EMPLOYEES |        | Parent Col<br>EMPLOYEE<br>EMPLOYEE<br>EMPLOYEE<br>EMPLOYEE | umn<br>[_ID<br>[_ID<br>[_ID |        |

8. Type in 'HR' in the Schema and 'Managers' in the Table Name to search for the appropriate column of data. Click on the Search button to execute. HR

| Table Name:  | М  | ANAGERS                          |              |           |              |
|--|--|----------------------------------|--------------|-----------|--------------|
| Data Masking Definitions > Create Masking Definition                             | >  |                                  |              |           |              |
| Add Dependent Columns  |  |                                  |              |           |              |
| Database d   | 1b04.oracle.com  |                                  | Logged In As | system    | Cancel (Add) |
| Parent Owner   | IR   |                                  | Parent Table | EMPLOYEES |              |
| Parent Column  | EMPLOYEE_ID  |                                  | Data Type    | NUMBER    |              |
| Search and add dependent columns that do not ha                                  | ave foreign key constraints define   | ed.                              |              |           |              |
| Only the first 2,000 columns are displayed. Spe<br>Sche<br>Table Na<br>Column Na | ediy search criteria to limit the nume<br>HR<br>MANAGERS<br>me<br>(Search) | ember of columns in the result s | et.          |           |              |
| Salart Owner   | Table Name   | Column Name                      | Data Type    |           |              |
| No columns   |  | Column Hame                      | Data Type    |           |              |
|  |  |                                  |              |           | Cancel Add   |

9. Select the MGR\_ID column and click on the Add button.

Schema:

| Search                             |                     |                                    |                                  |              |               |
|------------------------------------|---------------------|------------------------------------|----------------------------------|--------------|---------------|
| Only the first 2,000 columns are o | displayed. Specify: | search criteria to limit the numbe | er of columns in the result set. |              |               |
|                                    | Schema              | нв                                 | 1                                |              |               |
|                                    | Table Name          | MANAGERS                           |                                  |              |               |
|                                    | Column Name         |                                    | ]                                |              |               |
|                                    |                     | Search                             |                                  |              |               |
| Select All Select None             |                     |                                    |                                  |              |               |
| Select Owner                       | Table               | e Name                             | Column Name                      | Data Type    |               |
| HR HR                              | MAN                 | AGERS                              | APPROVAL_LIMIT                   | NUMBER(11)   |               |
| HR HR                              | MAN                 | AGERS                              | MGR_COST_CENTER                  | VARCHAR2(30) |               |
| HR HR                              | MAN                 | AGERS                              | MGR_ID                           | NUMBER       |               |
|                                    |                     |                                    |                                  |              | Cancel) (Add) |

10. You have successfully added a dependent column. The dependent column HR.MANAGERS.MGR\_ID will now be masked in the same way as the parent column, HR.EMPLOYEES.EMPLOYEE\_ID.



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11. The next step is to format the EMPLOYEE\_ID column. Continue by clicking on the icon.

| Depe                        | Information     Dependent columns were added and will be masked the same way as the parent column.     HR.EMPLOYEES.EMPLOYEE_ID - HR.MANAGERS.MGR_ID  |  |  |   |   |                                |   |                           |     |  |  |  |
|-----------------------------|---|--|--|---|---|--------------------------------|---|---------------------------|-----|--|--|--|
| Create I                    | reate Masking Definition  |  |  |   |   |                                |   |                           |     |  |  |  |
| Colur                       |   |  |  |   |   |                                |   |                           |     |  |  |  |
| Add col<br>that do<br>Remov | lumns you want to<br>not have foreign I<br>ing a column from  | mask and define masking<br>wey constraints defined, but<br>this list will remove all forei | ormat for each column. Fore<br>reference a masked column<br>gn key and dependent colum | eign key columns are auton<br>due to application level cor<br>ns. | natically added to maintain<br>Istraints. You can manuall | referential in<br>y add depend | itegrity. Dependent colum<br>dent columns to a masked | ns are columns<br>column. | Add |  |  |  |
| Select                      | All Select None   |  |  |   |   |                                |   |                           |     |  |  |  |
| Select                      | Select Owner Table Column Column Group Data Type Format Forekan Key Columns Count Add   |  |  |   |   |                                |   |                           |     |  |  |  |
|                             | Image: Communication         Communication <thcommunication< th="">         Communication         Co</thcommunication<> |  |  |   |   |                                |   |                           |     |  |  |  |
| J                           | Columns that  | have this icon do not have a   | a masking format defined.  |   |   |                                |   |                           |     |  |  |  |

12. As previously discussed, there are many different options to format the column of data to ensure the quality of the data masking. If you were to use an existing format from the Format Library, you would click on the Import Format button. In this particular example, we are going to select Random Numbers from the drop down list box and click on the Add button.

| Define Column Mask   |   |  |  |                                |                      |                                   |                            |
|--|---|--|--|--------------------------------|----------------------|-----------------------------------|----------------------------|
|  | Owner HR<br>Column EMPLOYEE_ID                                      |  | Data   | Table EMPLOYEES<br>Type NUMBER |                      |                                   | Cancel OK                  |
| By default all records in the table wi<br>masked in the order they are specifi | II be masked using the specified<br>ed. A subset will not be masked | d format. You can optionally identify<br>Lagain even when it matches a sub | more than one subset of re<br>sequent condition. | ecords using conditions. Each  | subset can be masked | lusing a corresponding masking fo | armat. The subsets will be |
| Import Format Format Entry   | Array List  | Add  |  |                                |                      |                                   | (Jobs Consider)            |
| Expand All   Collapse All  | Array List<br>Delete<br>Fixed Number                                |  | For  | mat Entry Properties           | 1227                 |                                   |                            |
| Conditions   | Null Value<br>Post-Processing Function                              | Property   | Value  | Property                       | Value                | Sample                            | Hemove                     |
| Pefault Condition     (Add a format entry)                                     | Preserve Original Data<br>Pandom Numbers                            | 1  |  |                                |                      |                                   |                            |
| Copyright © 1998, 2009, Oracle and/or its aff                                  | Substitute<br>Table Column<br>Truncate<br>User Defined Function     | Targets   Deployments   Ale  | ts   <u>Compliance</u>   <u>Jobs</u>             | Beports   Setup   Prefere      | nces i Helo i Loopou |                                   | Cancel OK                  |

13. Enter 1000000000 for the Start Value and 9999999999 for the End Value. Click on the Sample icon 🖻 to view sample data and continue by clicking the OK button.

| Import Format Entry Random Numbers |              |           |                  |            |            | (Add Condition) |
|------------------------------------|--------------|-----------|------------------|------------|------------|-----------------|
| Epand All Collapse All             |              |           |                  |            |            |                 |
|                                    |              | Format    | Entry Properties |            |            | . B             |
| Select Condition                   | Property     | Value     | Property         | Value      | Sample     | Remove          |
| ▼ Conditions                       |              |           |                  |            |            |                 |
| Default Condition                  |              |           |                  |            | 6862D94130 |                 |
| Random Numbers                     | Start: Value | 100000000 | End Value        | 0000000000 | -          | 7               |
|                                    | 1            |           |                  |            |            | Cancel OK       |



14. The next step is to add additional columns in the EMPLOYEES table to include in this masking operation. Click the Add button to continue.

| Create          | Masking Def                              | inition   |   |                                      |                             |                |                           |                |       |  |  |
|-----------------|--|---|---|--------------------------------------|-----------------------------|----------------|---------------------------|----------------|-------|--|--|
|                 |  |   |   |                                      |                             |                |                           | Cance          | I OK  |  |  |
|                 | * Name SIMPLE_EMPLOYEE_DATA_MASK         |   |   |                                      |                             |                | ]                         |                |       |  |  |
|                 | * Database db04.oraole.com               |   |   |                                      |                             |                |                           |                |       |  |  |
|                 | Description Mask Employee Data           |   |   |                                      |                             |                |                           |                |       |  |  |
| Colur           | Columns                                  |   |   |                                      |                             |                |                           |                |       |  |  |
| Add co          | olumns you want to                       | mask and define masking t   | ormat for each column. Fore                             | eign key columns are auton           | natically added to maintain | referential in | itegrity. Dependent colum | ns are columns |       |  |  |
| that de<br>Remo | o not have foreign<br>ving a column from | key constraints defined, but<br>1 this list will remove all forei | reference a masked column<br>an key and dependent colum | due to application level cor<br>ins. | istraints. You can manual   | y add depend   | dent columns to a masked  | column.        | (Add) |  |  |
| Re              | move                                     |   |   |                                      |                             |                |                           |                |       |  |  |
| Selec           | All Select None                          |   |   |                                      |                             |                |                           |                |       |  |  |
|                 | Dependent Columns                        |   |   |                                      |                             |                |                           |                |       |  |  |
| Selec           | t Owner                                  | Table   | Column  | Column Group                         | Data Type                   | Format         | Foreign Key Columns       | Count          | Add   |  |  |
|                 | HR                                       | EMPLOYEES   | EMPLOYEE_ID   |                                      | NUMBER                      |                | 5                         | 1              | ÷     |  |  |

15. Set HR as the Schema and EMPLOYEES as the Table Name and click on the Search button to query for appropriate columns.

|                            | Databar                     | se db02.oracle.com         |                |                             | Logged In As system   | Cancel    | Add | Define Format And A |
|----------------------------|-----------------------------|----------------------------|----------------|-----------------------------|---|-----------|-----|---------------------|
| one or more colu<br>Search | mins for masking. Foreign k | ey columns will be added a | automatically. | You can define masking form | at at once for all selected columns if they have the same d | ata type. |     |                     |
| Schema                     | HR                          |                            | 8              | Column Name                 |   |           |     |                     |
| Table Name                 | EMPLOYEES                   |                            |                | Column Comment              |   |           |     |                     |
|                            | Search                      |                            | ·              |                             | Enter a string in column comments.                          |           |     |                     |
| Mask selected              | i columne as a group        |                            |                |                             |   |           |     |                     |
| Select Owner               | Table Name                  | Column Name                |                | Data Type                   | Comment   |           |     |                     |
|                            |                             |                            |                |                             |   |           |     |                     |

16. Add 4 columns in HR.EMPLOYEES for masking (FIRST\_NAME, LAST\_NAME, PHONE\_NUMBER, SALARY). Select the 4 columns listed in the previous step and click on the Add button.

| ment wit   Series | A THAT     | Delawar Marra  | Data Tura     | Concerned.   |
|-------------------|------------|----------------|---------------|--|
| electOwner        | Table Name | Column Name    | Data Type     | Comment  |
| HR                | EMPLOYEES  | CITY           | VARCHAR2(30)  |  |
| HR                | EMPLOYEES  | COMMISSION_PCT | NUMBER(2,2)   | Commission percentage of the employee; Only employees in sales<br>department elgible for commission percentage   |
| HR HR             | EMPLOYEES  | COUNTRY_ID     | CHAR(2)       |  |
| HR                | EMPLOYEES  | DEPARTMENT_ID  | NUMBER(4)     | Department id where employee works; foreign key to department_id<br>column of the departments table  |
| HR                | EMPLOYEES  | EMAIL          | VARCHAR2(100) | MASK candidate: HR Privacy Policy  |
| HB                | EMPLOYEES  | EMPLOYEE_ID    | NUMBER        | MASK candidate: HR Benefits Policy   |
| HR HR             | EMPLOYEES  | FIRST_NAME     | VARCHAR2(20)  | MASK candidate: HR Privacy Policy  |
| HR                | EMPLOYEES  | HIRE_DATE      | DATE          | Date when the employee started on this job. A not null column.   |
| HR HR             | EMPLOYEES  | DI_BOL         | VARCHAR2(10)  | Current job of the employee; foreign key to job_id column of the jobs<br>table. A not null column.   |
| HR HR             | EMPLOYEES  | LAST_NAME      | VARCHAR2(25)  | MASK candidate: HR Privacy Policy  |
| HR HR             | EMPLOYEES  | MANAGER_ID     | NUMBER        | Manager ici of the employee; has same domain as manager_id in<br>departments table. Foreign key to employee_id column of employees<br>table. (useful for reflexive joins and CONNECT BY query) |
| HR HR             | EMPLOYEES  | NATIONAL_ID    | VARCHAR2(100) |  |
| HR HR             | EMPLOYEES  | PHONE_NUMBER   | VARCHAR2(20)  | Phone number of the employee; includes country code and area code  |
| HR                | EMPLOYEES  | POSTAL_CODE    | VARCHAR2(12)  |  |
| HR HR             | EMPLOYEES  | SALARY         | NUMBER(8,2)   | MASK candidate: HR Compensation Policy   |
| HR                | EMPLOYEES  | STATE_PROVINCE | VARCHAR2(10)  |  |
| HR                | EMPLOYEES  | STREET ADDRESS | VARCHAR2(40)  |  |





17. Now that we've added 4 more columns to mask, we need to define a masking format for each column. Click on the *A* icon to define a masking format for the column PHONE\_NUMBER.

| Colum             | ans                                |   |   |  |   |  |  |  |               |
|-------------------|------------------------------------|---|---|--|---|--|--|--|---------------|
| Add co<br>defined | lumns you want<br>d, but reference | to mask and define masking for<br>a masked column due to applic | .mat for each column. Foreign key colu<br>ation level constraints. You can manu | mins are automatically added to r<br>ally add dependent columns to a i | maintain referential integrity. Depende<br>masked column. Removing a column f | ent columns are column<br>from this list will remove | is that do not have for<br>all foreign key and o | oreign key constrair<br>dependent column | nts<br>s. Add |
| Rem               | nove)                              |   |   |  |   |  |  |  |               |
| Select            | All Select Nor                     | 22  |   |  |   |  |  |  | _             |
|                   |                                    |   |   |  |   |  | Foreign Key                                      | Dependent Col                            | lumns         |
| Select            | Owner                              | Table   | Column  | Column Group   | Data Type   | Format   | Columns  | Count                                    | Add           |
|                   | HR                                 | EMPLOYEES   | EMPLOYEE_ID   |  | NUMBER  | Ep   | 5  | 1  | ¢             |
|                   | HR                                 | EMPLOYEES   | PHONE_NUMBER  |  | VARCHAR2(20)  | 14   | o  | 0  | *             |
|                   | HR                                 | EMPLOYEES   | FIRST_NAME  |  | VARCHAR2(20)  | A  | 0  | 0  | \$            |
|                   | HR                                 | EMPLOYEES   | LAST_NAME   |  | VARCHAR2(25)  | k  | o  | 0  | \$            |
|                   | HR                                 | EMPLOYEES   | SALARY  |  | NUMBER(8,2)   | A  | 0  | 0  | *             |
| R                 | Columns that                       | i have this icon do not have a m                                | asking format defined.  |  |   |  |  |  |               |

18. For the column PHONE\_NUMBER, click on the Import Format button.

| Import Format Entry Array List  |          |       |                      |       |        | (Add Condition) |
|---|----------|-------|----------------------|-------|--------|-----------------|
|   |          | For   | mat Entry Properties |       |        |                 |
| Select Condition  | Property | Value | Property             | Value | Sample | Remove          |
| ▼Conditions   |          |       |                      |       |        |                 |
| Operation State |          |       |                      |       |        |                 |
| (Add a format entry)  |          |       |                      |       |        |                 |
|   |          |       |                      |       |        | (Cancel) (OK)   |

19. From the Import Format dialog, select Bay Area Phone Number and click on the Import button.

| Import | Format                     |                                 |             |                |                                     |  |            |
|--------|----------------------------|---------------------------------|-------------|----------------|-------------------------------------|--|------------|
|        | Database<br>Owner<br>Table | db04.oracle.<br>HR<br>EMPLOYEES | com<br>S    |                | Logged in As<br>Column<br>Data Type | system (Cancel<br>PHONE_NUMBER<br>VARCHAR2(20) | ) (Import) |
| Sear   | ch                         |                                 |             |                |                                     |  |            |
|        | Name                       |                                 |             |                |                                     |  |            |
|        | Owner                      |                                 |             |                |                                     |  |            |
|        |                            | Search                          |             |                |                                     |  |            |
|        |                            |                                 |             |                |                                     | Previous     1-25 of 27                        | Next 2 🔊   |
| Sele   | ct Format                  |                                 | Data Type   | Sample         | Description                         |  | Owner      |
| 0      | Anglo American First Name  |                                 | Source Type | Not Generated  | Anglo American First Nam            | e  | SYSMAN     |
| 0      | Anglo American Last Name   |                                 | Source Type | Not Generated  | Anglo American Last Name            | e  | SYSMAN     |
| 0      | Bay Area Phone Number      |                                 | Character   | (408) 555-6544 | Bay Area Phone Number               |  | SYSMAN     |
| 0      | Social Security Number     |                                 | Character   | 142521702      | Social Security Number              |  | SYSMAN     |
| 0      | Social Security String     |                                 | Character   | 883-30-9662    | Social Security String              |  | SYSMAN     |

20. Review the Default Condition for the format masking for the PHONE\_NUMBER column. Click on the 🗟 icon to review sample data from this format mask. Click on the OK button to continue.

|        |                    |         |            |                |                |                  |       |                | Add Condition |
|--------|--------------------|---------|------------|----------------|----------------|------------------|-------|----------------|---------------|
| Imp    | ort Format Format  | t Entry | Array List | \$ Add         |                |                  |       |                |               |
| Expand | d All Collapse All |         |            |                |                |                  |       |                |               |
|        |                    |         |            |                | Format         | Entry Properties |       |                |               |
| Select | Condition          |         |            | Property       | Value          | Property         | Value | Sample         | Remove        |
|        | Conditions         |         |            |                |                |                  |       |                |               |
| ۲      | Default Condition  |         |            |                |                |                  |       | (408) 555-7252 |               |
|        | Array List         |         |            | List of Values | (408),(510),(6 |                  |       |                | 2             |
|        | Fixed String       |         |            | Fixed String   | 555-           |                  |       |                | 2             |
|        | Random Digits      |         |            | Start Length   | 4              | End Length       | 4     |                | 2             |
|        |                    |         |            |                |                |                  |       |                | Cancel OK     |



21. Continue by clicking on the A icon to define a masking format for the column FIRST\_NAME.

| Colum  | Ins  |                              |                           |              |              |        |                     |       |     |  |  |  |  |
|--|--|------------------------------|---------------------------|--------------|--------------|--------|---------------------|-------|-----|--|--|--|--|
| Add co   | Add columns you want to mask and define masking format for each column. Foreign key columns are automatically added to maintain referential integrity. Dependent columns are columns   |                              |                           |              |              |        |                     |       |     |  |  |  |  |
| that do not have foreign key constraints defined, but reference a masked column due to application level constraints. You can manually add dependent columns to a masked column. |  |                              |                           |              |              |        |                     |       |     |  |  |  |  |
| Removing a column from this list will remove all foreign key and dependent columns.  |  |                              |                           |              |              |        |                     |       |     |  |  |  |  |
| Remove   |  |                              |                           |              |              |        |                     |       |     |  |  |  |  |
| Select   | Select All Select None   |                              |                           |              |              |        |                     |       |     |  |  |  |  |
|  | Dependent Columns  |                              |                           |              |              |        |                     |       |     |  |  |  |  |
| Select   | Owner  | Table                        | Column                    | Column Group | Data Type    | Format | Foreign Key Columns | Count | Add |  |  |  |  |
|  | HR   | EMPLOYEES                    | EMPLOYEE_ID               |              | NUMBER       | •      | 5                   | 1     | ዯ   |  |  |  |  |
|  | нв   | EMPLOYEES                    | PHONE_NUMBER              |              | VARCHAR2(20) | E.     | 0                   | 0     | ቍ   |  |  |  |  |
|  | HB   | EMPLOYEES                    | LAST_NAME                 |              | VARCHAR2(25) | 1      | 0                   | 0     | ቍ   |  |  |  |  |
|  | нв   | EMPLOYEES                    | SALARY                    |              | NUMBER(8,2)  | 1      | 0                   | o     | ቍ   |  |  |  |  |
|  | Image: |                              |                           |              |              |        |                     |       |     |  |  |  |  |
|  | Columns that   | have this icon do not have a | a masking format defined. |              |              | _      |                     |       |     |  |  |  |  |

22. For the column FIRST\_NAME, click on the Import Format button.

|   |          |       |                       |       |        | Add Condition |
|---|----------|-------|-----------------------|-------|--------|---------------|
| (Import Format) Format Entry Array List   |          |       |                       |       |        |               |
| Espand All   Collapse All   |          |       |                       |       |        |               |
|   |          | Fo    | rmat Entry Properties |       |        |               |
| Select Condition  | Property | Value | Property              | Value | Sample | Remove        |
| Conditions  |          |       |                       |       |        |               |
| Operation State |          |       |                       |       |        |               |
| (Add a format entry)  |          |       |                       |       |        |               |
|   |          |       |                       |       |        | (Canrel) (OK) |

23. From the Import Format dialog, select Anglo American First Name and click on the Import button.

| Selec | Format                    | Data Type   | Sample         | Description               |        |  |
|-------|---------------------------|-------------|----------------|---------------------------|--------|--|
| ٢     | Anglo American First Name | Source Type | Not Generated  | Anglo American First Name | SYSMAN |  |
| 0     | Anglo American Last Name  | Source Type | Not Generated  | Anglo American Last Name  | SYSMAN |  |
| 0     | Bay Area. Phone Number    | Character   | (510) 555-7481 | Bay Area Phone Number     | SYSMAN |  |

24. Repeat steps for column LAST\_NAME and select the format mask Anglo American Last Name

| Colum   | Jolumns   |                                |                           |  |              |   |   |   |   |  |  |  |
|---|---|--------------------------------|---------------------------|--|--------------|---|---|---|---|--|--|--|
| Add co  | dd columns you want to mask and define masking format for each column. Foreign key columns are automatically added to maintain referential integrity. Dependent columns are columns |                                |                           |  |              |   |   |   |   |  |  |  |
| that do   | that do not have foreign key constraints defined, but reference a masked column due to application level constraints. You can manually add dependent columns to a masked column.    |                                |                           |  |              |   |   |   |   |  |  |  |
| Remov   | Removing a column from this list will remove all foreign key and dependent columns.   |                                |                           |  |              |   |   |   |   |  |  |  |
| Rer   | (Remove)  |                                |                           |  |              |   |   |   |   |  |  |  |
| Select  | All Select None   | 2                              |                           |  |              |   |   |   |   |  |  |  |
|   | Dependent Columns   |                                |                           |  |              |   |   |   |   |  |  |  |
| Select Owner Table Column Column Group Data Type Format Foreign Key Columns Count Add |   |                                |                           |  |              |   |   |   |   |  |  |  |
|   | HR  | EMPLOYEES                      | EMPLOYEE_ID               |  | NUMBER       | - | 5 | 1 | ÷ |  |  |  |
|   | нв  | EMPLOYEES                      | PHONE_NUMBER              |  | VARCHAR2(20) | - | 0 | o | ቍ |  |  |  |
|   | HR  | EMPLOYEES                      | LAST_NAME                 |  | VARCHAR2(25) | 1 | 0 | o | ቍ |  |  |  |
|   | HR  | EMPLOYEES                      | SALARY                    |  | NUMBER(8,2)  | 1 | 0 | o | ቍ |  |  |  |
|   | □ HR EMPLOYEES FIRST_NAME VARCHAR2(20) E  |                                |                           |  |              |   |   |   |   |  |  |  |
|   | Columns that  | t have this icon do not have a | ı masking format defined. |  |              |   |   |   |   |  |  |  |

| Select | Format                    | Data Type   | Sample         | Description               | Owner  |
|--------|---------------------------|-------------|----------------|---------------------------|--------|
| 0      | Anglo American First Name | Source Type | Not Generated  | Anglo American First Name | SYSMAN |
| 0      | Anglo American Last Name  | Source Type | Not Generated  | Anglo American Last Name  | SYSMAN |
| 0      | Bay Area Phone Number     | Character   | (510) 555-7481 | Bay Area. Phone Number    | SYSMAN |



25. Continue by clicking on the 👫 icon to define a masking format for the column SALARY.

| Colum  | Columns  |                                |                           |              |              |        |                     |           |         |  |  |  |  |  |
|--|--|--------------------------------|---------------------------|--------------|--------------|--------|---------------------|-----------|---------|--|--|--|--|--|
| Add co   | Add columns you want to mask and define masking format for each column. Foreign key columns are automatically added to maintain referential integrity. Dependent columns are columns |                                |                           |              |              |        |                     |           |         |  |  |  |  |  |
| that do not have foreign key constraints defined, but reference a masked column due to application level constraints. You can manually add dependent columns to a masked column. |  |                                |                           |              |              |        |                     |           |         |  |  |  |  |  |
| Removing a column from this list will remove all foreign key and dependent columns.  |  |                                |                           |              |              |        |                     |           |         |  |  |  |  |  |
| Select   | All Select None  | 2                              |                           |              |              |        |                     |           |         |  |  |  |  |  |
| 000.000  | 700   <u>00000000000000</u>  |                                |                           |              |              |        |                     | Dependent | Columns |  |  |  |  |  |
| Select   | Owner  | Table                          | Column                    | Column Group | Data Type    | Format | Foreign Key Columns | Count     | Add     |  |  |  |  |  |
|  | HR   | EMPLOYEES                      | EMPLOYEE_ID               |              | NUMBER       | -      | 5                   | 1         | ቍ       |  |  |  |  |  |
|  | HR   | EMPLOYEES                      | PHONE_NUMBER              |              | VARCHAR2(20) | -      | 0                   | 0         | ቍ       |  |  |  |  |  |
|  | HR   | EMPLOYEES                      | LAST_NAME                 |              | VARCHAR2(25) | -      | 0                   | 0         | ቍ       |  |  |  |  |  |
|  | нв   | EMPLOYEES                      | SALARY                    |              | NUMBER(8,2)  | 1      | 0                   | 0         | ቀ       |  |  |  |  |  |
|  | HR   | EMPLOYEES                      | FIRST_NAME                |              | VARCHAR2(20) | -      | 0                   | 0         | ቀ       |  |  |  |  |  |
| 8  | Columns that   | t have this icon do not have a | a masking format defined. |              |              |        |                     |           |         |  |  |  |  |  |

26. For this column, we will randomly Shuffle the original column data within the table. Select Shuffle from the drop-down list box and then click on the Add button.

|           |                                       |                          |                |                   |                             |  |                       |         | Add Condition |
|-----------|---------------------------------------|--------------------------|----------------|-------------------|-----------------------------|--|-----------------------|---------|---------------|
|           | rt Format Entry                       | Array List               | Add            |                   |                             |  |                       |         |               |
| Expand    | All Collapse All                      | Array List               |                |                   |                             |  |                       |         |               |
|           |                                       | Delete                   |                |                   | Format                      | Entry Properties   |                       |         |               |
| Select    | Condition                             | Hixed Number             |                | Property          | Val ue                      | Property   | Value                 | Sam ple | Remove        |
|           | Conditions                            | Post-Processing Function |                |                   |                             |  |                       |         |               |
| ۲         | Default Condition                     | Preserve Original Data   |                |                   |                             |  |                       |         |               |
|           | (Add a format entry)                  | Bandom Numbers           | -              |                   |                             |  |                       |         |               |
|           |                                       | Shuffle                  | N              |                   |                             |  |                       |         |               |
|           |                                       | Substitute               |                |                   |                             |  |                       |         | Cancel OK     |
|           |                                       | Table Column             | I Targets   De | exiorments I Aler | ts I Compliance I Jobs I Be | orts I Setup I Preferen  | noes I Help I Loopout |         |               |
|           |                                       | Truncate                 | 1 101,000 1 10 | 140               |                             | The state of the s | and I then I togeth   |         |               |
| Copyright | © 1996, 2009, Oracle and/or its affil | User Defined Function    |                |                   |                             |  |                       |         |               |
| Oracle is | a registered trademark of Otacle Co   | polaioratuonis annaes.   |                |                   |                             |  |                       |         |               |

27. Review the Default Condition for the format masking for the SALARY column. Click on the 🗟 icon to review sample data from this format mask. Click on the OK button to continue.

|                                    |          |            |               |       |        | dd Condition |
|------------------------------------|----------|------------|---------------|-------|--------|--------------|
| Import Format Format Entry Shuffle |          |            |               |       |        |              |
| Expand All   Collapse All          |          |            |               |       |        |              |
|                                    |          | Format Ent | ry Properties |       |        |              |
| Select Condition                   | Property | Value      | Property      | Value | Sample | Remove       |
| ▼ Conditions                       |          |            |               |       |        |              |
| Default Condition                  |          |            |               |       | 2500   |              |
| Shuffle                            |          |            |               | •     |        | 2            |
|                                    |          |            |               |       | G      | ancel OK     |

28. Click on the OK button to complete the creation of a Masking Definition for the EMPLOYEES table.

| Create Masking Definition |                           |               |
|---------------------------|---------------------------|---------------|
|                           |                           | (Cancel) (OK) |
| * Name                    | SIMPLE_EMPLOYEE_DATA_MASK |               |
| * Database                | db04.oracle.com           | 3             |
| Description               | Mask Employee Data        |               |





29. Review that you have now successfully created a Data Masking Definition.

| Data Masking Definitions   |                          |                                    |                       |               |                       |  |  |  |  |  |
|--|--------------------------|------------------------------------|-----------------------|---------------|-----------------------|--|--|--|--|--|
| Data masking is the process of making sensitive information in test or non-production databases safe. It disguises sensitive information by overwriting it with realistic looking but false data of a similar type. A masking definition defines the columns to be masked and the format of masked data. You can create a new masking definition or use an existing definition for a masking operation. The Format Library |                          |                                    |                       |               |                       |  |  |  |  |  |
| contains a collection of ready-to-use masking formats.   |                          |                                    |                       |               |                       |  |  |  |  |  |
| Search Masking Definition  | Go                       |                                    |                       |               | (Import) Create       |  |  |  |  |  |
| View Edit Generate Script Schedule Job   | Delete Actions Clone     | Database 🗘 😡                       |                       |               |                       |  |  |  |  |  |
| Select Masking Definition 🛆  | Database                 | Description                        | Columns Status        | 5             | Most Recent Job Ended |  |  |  |  |  |
| SIMPLE EMPLOYEE DATA MASK  | db04.oracle.com          | Mask Employee Data                 | 6 Script              | Not Generated |                       |  |  |  |  |  |
| Format Library   |                          |                                    |                       |               |                       |  |  |  |  |  |
| A masking format defines the format of masked data. Y  | ou can create a new mask | ing format and reuse it later when | creating a masking de | efinition.    |                       |  |  |  |  |  |
| Format Library   |                          |                                    |                       |               |                       |  |  |  |  |  |

30. Before we Generate the Script to mask data, let's first query the existing unmasked data to compare the results after we mask the data. In the browser, select File -> New Tab.



31. In the new tab, click on the shortcut to go to Enterprise Manager – Grid Control.



32. Navigate EM and select Targets -> Databases -> db04.oracle.com.

| rid Control 11g       | e manayer   |                  |                   | Home Targets            | Deployment        | s Alerts Com  | pliance Jobs   | Reports          | ly Oracle Suppor |
|-----------------------|-------------|------------------|-------------------|-------------------------|-------------------|---------------|----------------|------------------|------------------|
| losts Databases   !   | liddleware  | Web Applications | Services   System | s   Groups   Virtual Se | ervers   All Targ | jets          |                |                  |                  |
| Databases             |             |                  |                   |                         |                   |               |                |                  |                  |
| iew Oracle Load Ma    | ap 💿 Search | List             |                   |                         |                   |               | Page Refreshed | Jul 27, 2010 9:4 | 5:48 PM UTC      |
| argets Not Configured | 1           |                  |                   |                         |                   |               |                |                  |                  |
| earch                 |             | Go Adv           | anced             |                         |                   |               |                |                  |                  |
|                       |             | 5                | earch             |                         |                   |               |                |                  |                  |
| (Remove) Configure    | Add         |                  |                   |                         |                   |               |                |                  |                  |
| elect Name 🔨          | Status      | Alerts           | Policy Violations | Compliance Score (%)    | Version           | Sessions: CPU | Sessions: I/O  | Sessions: Other  | Instance CPU (*  |
| av.oracle.com         |             |                  | 1 25 3            | 99                      | 10.2.0.3.0        |               |                |                  |                  |
| O db01.oracle.com     |             |                  | 5 28 6            | 98                      | 11.1.0.7.0        |               |                |                  |                  |
| O db02.oracle.com     |             |                  | 5 26 2            | 98                      | 11.1.0.7.0        |               |                |                  |                  |
| O db03.oracle.com     |             |                  | 1 26 3            | 99                      | 10.2.0.4.0        |               |                |                  |                  |
| (ab04.oracle.com      | Û           | 0.0              | 0 0 0             | -                       | 11.2.0.1.0        | -             | - 🗸            | - 🗸              |                  |
|                       |             |                  | 0 0 0             |                         | 11.2.0.1.0        |               |                |                  |                  |
| O db06.oracle.com     |             |                  |                   |                         |                   |               |                |                  |                  |

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33. Click on the Schema tab for db04.oracle.com and click on Tables under Database Objects.

| ORACLE<br>Grid Control | Enterprise Man | ager 10 <i>g</i> 📃  |                |          |                  |                      | Home | Targets | Deployments Alerts     | Setup<br>Compliance | Prelerences H | Help Logiout<br>Reports |
|------------------------|----------------|---------------------|----------------|----------|------------------|----------------------|------|---------|------------------------|---------------------|---------------|-------------------------|
| Hosts   Da             | atabases Midd  | leware   Wet        | b Applications | Services | Systems   Groups | All Targets          |      |         |                        |                     |               |                         |
| 1                      |                |                     |                |          |                  |                      |      |         |                        |                     | Logged in     | As SYSTEM               |
| Database               | Instance: d    | b02.oracle          | e.com          |          |                  |                      |      |         |                        |                     |               |                         |
| Home                   | Performance    | <u>Availability</u> | Server         | Schema   | Data Movement    | Software and Support | t    |         |                        |                     |               |                         |
|                        |                |                     |                |          |                  |                      |      |         |                        |                     |               |                         |
| Databas                | e Objects      |                     |                |          | Programs         |                      |      |         | Materialized Views     |                     |               |                         |
| Tables                 |                |                     |                |          | Packages         |                      |      |         | Materialized Views     |                     |               |                         |
| Indexes                |                |                     |                |          | Package Bodies   |                      |      |         | Materialized View Logs |                     |               |                         |
| Views                  |                |                     |                |          | Procedures       |                      |      |         | Refresh Groups         |                     |               |                         |

- 34. If you are brought to the Database Login screen, login as system/oracle1. Leave "Connect As" set to Normal, and then clock the Login button.
- 35. For the table search, enter HR for the Schema and EMPLOYEES for the Object name.

| Tables           |                             |   |
|------------------|-----------------------------|---|
| Count            |                             |   |
| Select an object | t type and optionally enter | schema name and an object name to filter the data that is displayed in your results set |
| Schema           | нв                          |   |
|                  | (THE OVERA                  | *   |
| Object Name      | EMPLOYEES                   |   |
|                  | Go                          |   |

36. Select View Data from the drop-down list box and click on the GO button.

| Selec | tion Mode Single 💲        |                        |            |                |                                | Create |
|-------|---------------------------|------------------------|------------|----------------|--------------------------------|--------|
| Edi   | t) View) Delete With Opti | ions Actions View Data | ÷          |                |                                |        |
| Selec | t Schema 🛆                | Table Name             | Tablespace | Partitioned Ro | ws Last Analyzed               |        |
| ۲     | HR.                       | EMPLOYEES              | EXAMPLE    | NO             | 07 May 13, 2009 3:36:05 AM EDT |        |

37. Leave this tab open so you can later reference the data before the data masking operation is executed.

|          | CLE Enterpris  | se Marrager   | 10 <i>g</i>   |   |   |   |                           |               | н                       | ome Targets Deploymen   | its Alerts Com      | <u>Setup</u> <u>Pret</u> i<br>pliance | jobs Report:              | 2011<br>S |
|----------|--|---|---|---|---|---|---------------------------|---------------|-------------------------|-------------------------|---------------------|---------------------------------------|---------------------------|-----------|
| Host     | s   Databases  | Middlewar   | e   Web App   | dications   Se                                    | vices   Systems   | Groups   A                                | Il Targets                |               |                         |                         |                     |                                       |                           |           |
| Database | e historice: db02.ora                                      | cle.com > ]   | Tables >  |   |   |   |                           |               |                         |                         |                     | L                                     | ogged in As SY            | STEN      |
| View     | Data for Tab   | le: HR.EI   | MPLOYEE   | S   |   |   |                           |               |                         |                         |                     |                                       |                           |           |
|          |  |   |   |   |   |   |                           |               |                         |                         |                     | 0                                     | Refine Query              | OK        |
| Query    | SELECT "EMP<br>"HIRE_DATE",<br>"NATIONAL_ID<br>"COUNTRY_ID | "LOYEE_ID"<br>"JOB_ID", '<br>J', "STREET<br>I" FROM "HP | ", "FIRST_NAI<br>"SALARY", "C<br>"_ADDRESS",<br>"."'EMPLOYE | ME", "LAST_NA<br>OMMISSION_I<br>"POSTAL_CO<br>ES" | ME", "EMAIL", "P<br>PCT", "MANAGER<br>DE", "CITY", "STA | Hone_Numbe<br>_ID", "Depart<br>Te_Provinc | er",<br>Iment_Id",<br>e", |               |                         |                         |                     |                                       |                           |           |
| Result   |  |   |   |   |   |   |                           |               |                         |                         |                     |                                       | © Previou                 | s []-     |
|          | EMPLOY EE_ID   | FIRST_NA  | ME LAST_NA  | MEEMAIL   | PHONE_NUMBE   | THE DATE                                  | JOB ID                    | SALARY COMMIS | SSION_PCT MANAGER_ID DE | PARTMENT_ID NATIONAL_IL | OSTREET_ADDRESS     | POSTAL                                | CODECITY                  | ST        |
|          | 100  | Gilard  | Geor  | CALON   | 0.007.007.0070  | 00:00:00.0                                | SH_CLERK                  | 2000          | 120                     | 00 301-01-0404          | 2011 Interiors Bits | 692.00                                | San<br>Francisco          |           |
|          | 185  | 5 Alexis  | Bull  | ABULL   | 650.509.2876  | 1997-02-20<br>00:00:00.0                  | SH_CLERK                  | 4100          | 121                     | 50 932-32-5187          | 2011 Interiors Blvd | 99236                                 | South<br>San<br>Francisco | Cal       |
|          | 187  | " Anthony   | Cabrio  | ACABRIO   | 650.509.4876  | 1999-02-07<br>00:00:00.0                  | SH_CLERK                  | 3000          | 121                     | 50 253-45-1395          | 2011 Interiors Blvd | 99236                                 | South<br>San<br>Francisco | Cal       |
|          | 189  | ) Jenni fer   | Dilly   | JDILLY  | 650.505.2876  | 1997-08-13<br>00:00:00.0                  | SH_CLERK                  | 3600          | 122                     | 50 344-11-3588          | 2011 Interiors Blvd | 99236                                 | South<br>San<br>Francisco | Cal       |
|          | 192  | 2 Sarah   | Bell  | SBELL   | 650.501.1876  | 1996-02-04<br>00:00:00.0                  | SH_CLERK                  | 4000          | 123                     | 50 706-90-4072          | 2011 Interiors Blvd | 99236                                 | South<br>San<br>Francisco | Cal       |
|          | 194  | 4 Samuel  | McCain  | SMCCAIN   | 650.501.3876  | 1998-07-01<br>00:00:00.0                  | SH_CLERK                  | 3200          | 123                     | 50 738-39-7522          | 2011 Interiors Blvd | 99236                                 | South<br>San<br>Francisco | Cal       |

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38. Navigate back to the first browser tab. The next step is to select the SIMPLE\_EMPLOYEE\_DATA\_MASK and click on the Generate Script button.

| Data Masking Definitions  |  |                    |         |                      |                       |  |  |  |  |  |  |
|---|--|--------------------|---------|----------------------|-----------------------|--|--|--|--|--|--|
| Data masking is the process of making sensitive information in test or non-production databases safe. It disguises sensitive information by overwriting it with realistic looking but false data of a similar type. A masking definition defines the columns to be masked and the format of masked data. You can create a new masking definition or use an existing definition for a masking operation. The Format Library contains a collection of ready-to-use masking formats. |  |                    |         |                      |                       |  |  |  |  |  |  |
| Search Masking Definition   | Search Masking Definition 🗧 Co (Import) Create |                    |         |                      |                       |  |  |  |  |  |  |
| View) Edit Generate Script Schedule Job De  | elete Actions Clone                            | Database 🗘 🕝       |         |                      |                       |  |  |  |  |  |  |
| Select Masking Definition 🛆   | Database                                       | Description        | Columns | Status               | Most Recent Job Ended |  |  |  |  |  |  |
| SIMPLE EMPLOYEE DATA MASK   | db04.oracle.com                                | Mask Employee Data | 6       | Script Not Generated |                       |  |  |  |  |  |  |
| Format Library  |  |                    |         |                      |                       |  |  |  |  |  |  |
| A masking format defines the format of masked data. You can create a new masking format and reuse it later when creating a masking definition.  |  |                    |         |                      |                       |  |  |  |  |  |  |
| Format Library  |  |                    |         |                      |                       |  |  |  |  |  |  |

39. After clicking on the Generate Script button, the data masking script will be generated.

| Database     | db04.oracle.com                         | Number of Tables | 6  | Ca |
|--------------|---|------------------|----|----|
| Logged In As | system                                  | Columns          | 11 |    |
| 3 1 33       | , |                  |    |    |
|              |   | $\bigcirc$       |    |    |
|              |   |                  |    |    |

40. You will be forwarded to the Script Generation Results page. There are a number of areas to explore. All of the highlighted buttons and actions can also be accessed on the Data Masking Definitions screen.

| ① Information  |  |                    |  |  |  |  |  |
|--|--|--------------------|--|--|--|--|--|
| Data masking script generation completed successfully.   |  |                    |  |  |  |  |  |
| Script Generation Results: SIMPLE_EMPLOYEE_DATA_MASK   |  |                    |  |  |  |  |  |
| Database db04.oracle.com   | Number of Tables 6   | (Return)           |  |  |  |  |  |
| Logged In As system  | Columns 11   |                    |  |  |  |  |  |
| Script Options   |  |                    |  |  |  |  |  |
| Use script to clone and mask the database. Clone And Mask  |  |                    |  |  |  |  |  |
| Schedule the data masking job. The script will be executed by the job to perform the masking opera | tion. Schedule Job   |                    |  |  |  |  |  |
|  |  |                    |  |  |  |  |  |
| ▼ Script   |  |                    |  |  |  |  |  |
| The script summary is a list of the database commands that will be used to mask the selected colum | nns. The full script is a PL/SQL script that includes functions, procedures, and | (Save Full Script) |  |  |  |  |  |
| other commands needed during the masking operation. The full script will be executed by the job to | perform the masking operation.   |                    |  |  |  |  |  |
| View 🕘 Script Summary 🔿 Full Script  |  |                    |  |  |  |  |  |
| Target database: db04.oracle.com   |  |                    |  |  |  |  |  |
| Script generated at: 27-JUL-2010 21:50   | =  |                    |  |  |  |  |  |
| COMMIT   | -  |                    |  |  |  |  |  |
| ALTER SESSION ENABLE PARALLEL DML  |  |                    |  |  |  |  |  |
| DROP TABLE 'MGMT_DM_TT_8' PURGE  |  |                    |  |  |  |  |  |
| declare  |  |                    |  |  |  |  |  |
| adj number:=0;   |  |                    |  |  |  |  |  |
| num number:=0;   |  |                    |  |  |  |  |  |
| begin  |  |                    |  |  |  |  |  |

41. Scroll down to the bottom of the page and expand the Impact Report section. The Impact Report will provide a summary of the script generation and important details about the objects and resources necessary to complete the job successfully. If there are any issues here, they should be corrected before moving forward.



| cript Generation Summary      |                    |                     |                |  |  |  |  |
|-------------------------------|--------------------|---------------------|----------------|--|--|--|--|
| Most Serious Message Severity |                    |                     | sage Severity  | INFORMATION  |  |  |  |
|                               | Generation Started |                     | ration Started | Jul 27, 2010 9:50:34 PM  |  |  |  |
|                               |                    | Generatio           | on Completed   | Jul 27, 2010 9:51:06 PM  |  |  |  |
| Script Generation Information |                    |                     |                |  |  |  |  |
| The following                 | table provides i   | nformation about th | e objects and  | resources examined during script generation and lists details of any warnings or errors detected.                    |  |  |  |
| Object                        |                    | Message             | Message        |  |  |  |  |
| Name                          | Object Type        | Severity            | Туре           | Message  |  |  |  |
| EXAMPLE                       | TABLESPACE         | INFORMATION         | Plan           | Sufficient free space in Tablespace EXAMPLE. Starting Freespace with automatic extension: 33473MB. Ending Freespace: |  |  |  |
|                               |                    |                     |                | 33473MB. Lowest Freespace: 33473MB.  |  |  |  |
| USERS                         | TABLESPACE         | INFORMATION         | Plan           | Sufficient free space in Tablespace USERS. Starting Freespace with automatic extension: 33146MB. Ending Freespace:   |  |  |  |
|                               |                    |                     |                | 33146MB. Lowest Freespace: 33146MB.  |  |  |  |
| нв                            | USER               | INFORMATION         | Plan           | Sufficient tablespace quota for User HR.   |  |  |  |
|                               |                    |                     |                |  |  |  |  |

42. Scroll back up the page and click on the Save Full Script button. Take note of the file name of the .sql file to review in detail later. This script could be taken and executed on other targets.

| masking20090   | 5130502.sql                                |
|--|--|
| from: http://dbse  | document<br>curity oracle.com:4889         |
| /hat should Fire   | fox do with this file?                     |
| O <u>O</u> pen with  | Text Editor (default)                      |
|  |  |
| Do this auto   | matically for files like this from now on. |
| <ul> <li>Open with</li> <li>Save File</li> <li>Do this auto</li> </ul> | matically for files like this from now on. |

43. Click on the Clone Mask button under the Script Option section. Review the number of supported options to clone the database and create a staging environment for the script to be executed and data to be masked.

| Specify the source for the cloning operation.  | (Cancel) (Continu  |
|--|--|
| <ul> <li>À running data base</li> <li>Use Recovery Manager (RMAN) to copy database files</li> <li>Stiping areas notrequired. RBAN sill copy teadinedy to destination locations.</li> <li>Copy database files via staging areas</li> <li>Require staging areas no both source and destination hosts.</li> <li>An existing database backup</li> <li>TIP A snapshot standby database is an alternative for running repetitive testing scenarios.</li> <li>Create Snapshot Standby Database</li> </ul> | Overview Cone Database offers the following options:  Use Recovery Manager (RMAN) to copy database files Connects source and destatiation Oracle Instances Copie database files uning RMAN dupicate feature Recovers and opens the cloned database Copy database files via stag ing areas Copy database files via stag ing areas Backs up each database file and stores II in a staging area. Transfers each backup file to the specified locations Recovers and opens the cloned database Coreates cloned database backup Coreates cloned database as of specified point-in-time or SCN Validates backups prior to the clone operation Transfers required archived redo log files to destination host Recovers and opens the cloned database |

44. Click on the browser's back button to return to the previous screen and click on the Schedule Job button to immediately schedule and run the masking operation. Provide the Host Credentials using the user: Oracle and the provided password. Click on the Submit button to execute the job.



| Database db04.oracle.c  | m                      | Number of Tab                            | les 6 (Cancel) Submit |
|-------------------------|------------------------|--|-----------------------|
| Logged In As system     |                        | Colum                                    | ins 11                |
|                         | * Job Name             | MASKING JOB 5                            |                       |
| -in                     | Description            | [  |                       |
| - Seciet                | File Legetien          | w01/omain/orad/ust/11.2.0/diskoma_1/disc | 1                     |
| * Script                | * Script File Location |  | ST                    |
| * Scr                   | ot File Name           | masking5.sql                             |                       |
| Host Credentials        |                        |  |                       |
| * Usernan               | e oracle               |  |                       |
| * Passwo                | d                      |  |                       |
|                         | Save                   | as Preferred Credential                  |                       |
| Start                   |                        |  |                       |
| Immediately             |                        |  |                       |
| O Later                 |                        |  |                       |
| Date Jul 27, 2010       |                        |  |                       |
| Time 9 🗢 50 🗢 🔿 AM 🕘 PM |                        |  |                       |

45. Once you submit the job, you will be forwarded to a confirmation page that the job was submitted successfully. Click on the GO button to refresh the status of the job.

| Job Submitted Successfully  | Dob Submitted Successfully |                    |                         |                       |  |  |  |  |
|---|----------------------------|--------------------|-------------------------|-----------------------|--|--|--|--|
| Data Masking job has been submitted successfully. Glick on the View Job Details link below to view execution status.<br><u>View Job Details</u>   |                            |                    |                         |                       |  |  |  |  |
| Data Masking Definitions  |                            |                    |                         |                       |  |  |  |  |
| Data masking is the process of making sensitive information in test or non-production databases safe. It disguises sensitive information by overwriting it with realistic looking but fabe data of a similar type. A masking definition defines the columns to be masked and the format of masked data. You can create a new masking definition or use an existing definition for a masking operation. The Format Library<br>contains a collection of ready-to-use masking formats. |                            |                    |                         |                       |  |  |  |  |
| Search Database + 'db04.oracle.com' Co  |                            |                    |                         |                       |  |  |  |  |
| (View) (Edit) (Generate Script) (Schedule Job) (Delete) Actions Clone Database 💠 (Go)   |                            |                    |                         |                       |  |  |  |  |
| Select Masking Definition 🛆   | Database                   | Description        | Columns Status          | Most Recent Job Ended |  |  |  |  |
| SIMPLE EMPLOYEE DATA MASK   | db04.oracle.com            | Mask Employee Data | 6 Masking Job Scheduled |                       |  |  |  |  |

46. Once the job successfully completes, Repeat step 30 to 36 to create a new tab and query the masked data for a before and after comparison.

| (View) (Edit) (Generate Script) (Schedule Job | Delete Actions  | Clone Database 🗘 😡 |                         |                                   |
|---|-----------------|--------------------|-------------------------|-----------------------------------|
| Select Masking Definition 🛆                   | Database        | Description        | Columns Status          | Most Recent Job Ended             |
| SIMPLE EMPLOYEE DATA MASK                     | db04.oracle.com | Mask Employee Data | 6 Masking Job Succeeded | Jul 27, 2010 9:57:00 PM GMT+00:00 |

47. Toggle between the two browser tabs and review the data before the masking job and after the successful masking operation of the 5 columns defined.



# Using compound masking, condition-based masking and user defined masking

1. Navigate to the Data Masking Definitions by selecting **Targets -> Databases -> Data Masking Definitions**.

| ORA<br>Grid Co<br>Hosts | CLE Enterprise<br>antrol 11g<br>Databases M  | a Manager<br>Niddleware   We | b Applications | Services   System:          | Home Targets<br>s   Groups   Virtual Se | Deployments | Alerts Con    | npliance 👔 Jobs    | Setup F<br>Reports N | reterences <u>Help Logout</u><br>ly Oracle Support |
|-------------------------|--|------------------------------|----------------|-----------------------------|---|-------------|---------------|--------------------|----------------------|--|
| Data                    | Databases  |                              |                |                             |   |             |               |                    |                      |  |
| View<br>Target          | View 🗘 Oracle Load Map 🐵 Search List Page Refreshed Jul 27, 2010 5:18:48 PM UTC 🖹    |                              |                |                             |   |             |               |                    |                      |  |
| Search                  | Search Search  |                              |                |                             |   |             |               |                    |                      |  |
| Ren                     | move)(Configure  | Add                          |                |                             |   |             |               |                    |                      |  |
| Select                  | t Name 🛆   | Status                       | Alerts         | Policy Violations           | Compliance Score (%)                    | Version     | Sessions: CPU | Sessions: I/O      | Sessions: Other      | Instance CPU (%)                                   |
| ۲                       | av.oracle.com  | 4                            |                | <u>1</u> <u>25</u> <u>3</u> | 99                                      | 10.2.0.3.0  |               |                    |                      |  |
| 0                       | db01.oracle.com  | 4                            |                | <u>5 28 6</u>               | 98                                      | 11.1.0.7.0  |               |                    |                      |  |
| 0                       | db02.oracle.com  | 4                            |                | <u>5 26 2</u>               | 98                                      | 11.1.0.7.0  |               |                    |                      |  |
| 0                       | db03.oracle.com  | 4                            |                | 1 26 3                      | 99                                      | 10.2.0.4.0  |               |                    |                      |  |
| 0                       | db04.oracle.com  | Ŷ                            | <u>0</u> 0     | 000                         | -                                       | 11.2.0.1.0  | -             | - 🧹                | - 🖌                  | -  |
| 0                       | db06.oracle.com  | 4                            |                | 000                         | -                                       | 11.2.0.1.0  |               |                    |                      |  |
| 0                       | emrep.oracle.com   | Û                            | 14             | <u>15 69 5</u>              | 92                                      | 10.2.0.4.0  | <u>.01</u>    | .01 🛷              | Q 🛷                  | .44  |
| €тр                     | TID For an exclusion of the leave and exclusion used in this wave, one the leave Key |                              |                |                             |   |             |               |                    |                      |  |
| Re                      | ated Links   | and the second diffe         | -,             |                             |   |             |               |                    |                      |  |
| Cu                      | stomize Table Colu   | mns                          |                | Data Mas                    | king Definitions                        |             | Data N        | lasking Format Lib | rary                 |  |
| Die                     | tionary Baselines  |                              |                | Dictionary                  | Comparisons                             |             | Diction       | ary Synchronizatio | ns                   |  |
| Exe                     | Execute SQL Recovery Catalogs  |                              |                |                             |   |             |               |                    |                      |  |

2. From the **Data Masking Definitions** Dialog, we will create a new definition to create a Compound Mask with the **HR.EMPLOYEES** table. Click on the **Create** button to begin the process of creating a new data mask.

| Data Masking Definitions   |   |                    |   |                       |                                   |  |  |
|--|---|--------------------|---|-----------------------|-----------------------------------|--|--|
| Data masking is the process of making sensitive information in test or non-production databases safe. It disguises sensitive information by overwriting it with realistic boking but false data of a similar type. A masking definition defines the columns to be masked and the format of masked data. You can create a new masking definition or use an existing definition for a masking operation. The Format Library contains a collection of ready-to-use masking formats. |   |                    |   |                       |                                   |  |  |
| Search Database 🗘 Idt04.oracle.com Go (Import Create)  |   |                    |   |                       |                                   |  |  |
| View) (Edit) (Generate Script) (Schedule Job) (Delete) Actions Clone Database 🗘 (Go)   |   |                    |   |                       |                                   |  |  |
| Select Masking Definition 🛆  | ct Masking Definition 🛆 Database Description Columns Status Most Recent Job Ended |                    |   |                       |                                   |  |  |
| SIMPLE EMPLOYEE DATA MASK  | db04.oracle.com   | Mask Employee Data | 6 | Masking Job Succeeded | Jul 27, 2010 9:57:00 PM GMT+00:00 |  |  |

- From the Create Masking Definition screen, type in the Name, Database and Description field with the provided values below. Continue and click on the Add button.
  - i. Name: HR\_COMPOUND\_MASK Database: db04.oracle.com Description: Compound Mask of HR Data



| reate I | Masking Defi       | nition                         |                            |                          |                               |                |                            | Conc            |         |
|---------|--------------------|--------------------------------|----------------------------|--------------------------|-------------------------------|----------------|----------------------------|-----------------|---------|
|         |                    | * Name                         | HR_COMPOUND_MASH           | IR_COMPOUND_MASK         |                               |                |                            | Canc            |         |
|         |                    | * Database                     | db04.oracle.com            | ib04.oracle.com          |                               |                |                            |                 |         |
|         |                    | Description                    | Compound Mask of HR        | Compound Mask of HR Data |                               |                |                            |                 |         |
| Columns |                    |                                |                            |                          |                               |                |                            |                 |         |
| Add co  | lumns you want to  | mask and define masking        | format for each column. Fo | oreign key columns are a | automatically added to mainta | in referential | integrity. Dependent colum | ins are columns |         |
| Remov   | ring a column from | this list will remove all fore | ign key and dependent colu | imns.                    | erconstraints. You can manue  | ny add deper   | ident columns to a master  | column.         | Add     |
|         |                    |                                |                            |                          |                               |                |                            | Dependent (     | Columns |
| Select  | Owner              | Table                          | Column                     | Column Group             | Data Type                     | Format         | Foreign Key Columns        | Count           | Add     |
|         | No columns         |                                |                            |                          |                               |                |                            |                 |         |

4. If you are brought to the **Database Login** screen, login as **system/oracle1**. Leave "Connect As" set to Normal, and then clock the **Login** button.

| Database Login          |                              |  |  |  |  |
|-------------------------|------------------------------|--|--|--|--|
| * Username              | system                       |  |  |  |  |
| * Password              |                              |  |  |  |  |
| Database db04.omcle.com |                              |  |  |  |  |
| * Connect As            | Normal 🗢                     |  |  |  |  |
|                         | Save as Preferred Credential |  |  |  |  |
|                         | (Cancel) (Login)             |  |  |  |  |

5. We are going to search for the **EMPLOYEES** table in the HR Schema. Type in the following values and click on the **Search** button.

| Schema:     | HR       |
|-------------|----------|
| Table Name: | EMPLOYEE |

| Data Mask | ing Definition   | s > Create Masking Definition | >           |                     |           |       |                                   |        |     |                       |
|-----------|--|-------------------------------|-------------|---------------------|-----------|-------|-----------------------------------|--------|-----|-----------------------|
| Add Co    | lumns  |                               |             |                     |           |       |                                   |        |     |                       |
|           |  | Database db04.ora             | cle.com     | Logged In As system |           |       | lin As system                     | Cancel | Add | Define Format And Add |
| Add one o | dd one or more columns for masking. Foreign key columns will be added automatically. You can define masking format at once for all selected columns if they have the same data type. |                               |             |                     |           |       |                                   |        |     |                       |
| Searc     | h  |                               |             |                     |           |       |                                   |        |     |                       |
|           | Schema   | HR                            |             | <i>3</i>            | Column Na | ame 🗌 |                                   |        | ]   |                       |
| Та        | ble Name   | EMPLOYEES                     |             | Column Comment      |           |       |                                   | ]      |     |                       |
|           | [  | (Search)                      |             |                     |           | En    | nter a string in column comments. |        | -   |                       |
| □ Ma      | ask selected   | columns as a group            |             |                     |           |       |                                   |        |     |                       |
| Selec     | t Owner  | Table Name                    | Column Name |                     | Data Type | Comm  | ent                               |        |     |                       |
|           | No column  | s                             |             |                     |           |       |                                   |        |     |                       |
|           |  |                               |             |                     |           |       |                                   | Cancel | Add | Define Format And Add |

6. Select the columns to be included in the mask. They are: CITY, COUNTRY\_ID, PHONE\_NUMBER, POSTAL\_CODE, STATE\_PROVINCE, STREET\_ADDRESS. Check the box to "Mask selected columns as a group" to specify that you want to use mask these columns as a compound mask and continue by clicking on the Add button.



| 🗹 Mask selecte   | d columns as a group | ←              |               |   |                              |
|------------------|----------------------|----------------|---------------|---|------------------------------|
| Select All Selec | t None               |                |               |   |                              |
| Select Owner     | Table Name           | Column Name    | Data Type     | Comment   |                              |
| HR HR            | EMPLOYEES            | CITY           | VARCHAR2(30)  |   |                              |
| HR HR            | EMPLOYEES            | COMMISSION_PCT | NUMBER(2,2)   | Commission percentage of the employee; Only employees in sales<br>department elgible for commission percentage  |                              |
| MR HR            | EMPLOYEES            | COUNTRY_ID     | CHAR(2)       |   |                              |
| HR HR            | EMPLOYEES            | DEPARTMENT_ID  | NUMBER(4)     | Department id where employee works; foreign key to department_id<br>column of the departments table   |                              |
| HR HR            | EMPLOYEES            | EMAIL          | VARCHAR2(100) | MASK candidate: HR Privacy Policy   |                              |
| HR HR            | EMPLOYEES            | EMPLOYEE_ID    | NUMBER        | MASK candidate: HR Benefits Policy  |                              |
| HR HR            | EMPLOYEES            | FIRST_NAME     | VARCHAR2(20)  | MASK candidate: HR Privacy Policy   |                              |
| HR HR            | EMPLOYEES            | HIRE_DATE      | DATE          | Date when the employee started on this job. A not null column.  |                              |
| HR HR            | EMPLOYEES            | JOB_ID         | VARCHAR2(10)  | Current job of the employee; foreign key to job_id column of the jobs<br>table. A not null column.  |                              |
| HR HR            | EMPLOYEES            | LAST_NAME      | VARCHAR2(25)  | MASK candidate: HR Privacy Policy   | <b>►</b>                     |
| HR HR            | EMPLOYEES            | MANAGER_ID     | NUMBER        | Manager id of the employee; has same domain as manager_id in<br>departments table. Foreign key to employee_id column of employees<br>table. (useful for reflexive joins and CONNECT BY query) |                              |
|                  | EMPLOYEES            | NATIONAL ID    | VARCHAR2(100) |   |                              |
| HR HR            | EMPLOYEES            | PHONE NUMBER   | VARCHAR2(20)  | Phone number of the employee; includes country code and area code   |                              |
| HR HR            | EMPLOYEES            | POSTAL_CODE    | VARCHAR2(12)  |   |                              |
| HR HR            | EMPLOYEES            | SALARY         | NUMBER        | MASK candidate: HR Compensation Policy  |                              |
| MR HR            | EMPLOYEES            | STATE_PROVINCE | VARCHAR2(10)  |   |                              |
| HR HR            | EMPLOYEES            | STREET_ADDRESS | VARCHAR2(40)  |   |                              |
|                  |                      |                |               |   | Cancel Add Define Format And |

7. Continue by clicking on any of the A Format icons.

|               |   |  |  |                                  |  |             |                                    | Canc                                | el) (C   |
|---------------|---|--|--|----------------------------------|--|-------------|------------------------------------|-------------------------------------|--|
|               |   | * Name   | HR_COMPOUND_MASH   | 4                                |  |             |                                    |                                     |  |
|               |   | * Database   | db04.oracle.com  |                                  |  | <i>3</i>    |                                    |                                     |  |
|               |   | Description  | Compound Mask of HR  | Data                             |  |             |                                    |                                     |  |
| olum          | nns                                       |  |  |                                  |  |             |                                    |                                     |  |
| Remov         | ring a column fro                         | om this list will remove all fore  | ign key and dependent coll                                     | imns.                            |  |             |                                    |                                     | 4  |
| Remov         | ring a column fro                         | om this list will remove all fore  | ign key and dependent colu                                     | imns.                            | si constraints. Tou can manuali                                      | y add depen | dent columns to a mashed           | column.                             | 4  |
| Rer           | nove)                                     |  |  |                                  |  |             |                                    |                                     |  |
| _             |   |  |  |                                  |  |             |                                    |                                     |  |
| Select        | All Select Nor                            | 10   |  |                                  |  |             |                                    |                                     |  |
| Select        | All Select Nor                            | <u>18</u>  |  |                                  |  |             |                                    | Dependent                           | Colun  |
| <u>Select</u> | <u>All Select Nor</u>                     | ne<br>Table  | Column   | Column Group                     | Data Type  | Format      | Foreign Key Columns                | Dependent (<br>Count                | Colun<br>Ad                                    |
| Select        | All Select Nor<br>Owner<br>HR             | Table<br>EMPLOYEES   | Column<br>PHONE_NUMBER   | Column Group<br>1                | Data Type<br>VARCHAR2(20)  | Format      | Foreign Key Columns<br>O           | Dependent<br>Count<br>O             | Colun<br>Ad<br>슈                               |
| Select        | All Select Nor<br>Owner<br>HR<br>HR       | Table<br>EMPLOYEES<br>EMPLOYEES  | Column<br>PHONE_NUMBER<br>CITY                                 | Column Group<br>1                | Data Type<br>VARCHAR2(20)<br>VARCHAR2(30)                            | Format      | Foreign Key Columns<br>O           | Dependent Count<br>Count<br>0       | Colun<br>Ad<br>දා<br>දා                        |
| Select        | All Select Nor<br>Owner<br>HR<br>HR       | EMPLOYEES EMPLOYEES  | Column<br>PHONE_NUMBER<br>CITY<br>STREET_ADDRESS               | Column Group<br>1<br>1<br>1      | Data Type<br>VARCHAR2(20)<br>VARCHAR2(30)<br>VARCHAR2(40)            | Format      | Foreign Key Columns<br>O<br>O<br>O | Dependent (<br>Count<br>0<br>0      | Colun<br>Ad<br>දා<br>දා                        |
|               | All Select Nor<br>Owner<br>HR<br>HR<br>HR | e EMPLOYEES EMPL | Column<br>PHONE_NUMBER<br>CITY<br>STREET_ADDRESS<br>COUNTRY_ID | Column Group<br>1<br>1<br>1<br>1 | Data Type<br>VARCHAR2(20)<br>VARCHAR2(30)<br>VARCHAR2(40)<br>CHAR(2) | Format      | Foreign Key Columns<br>0<br>0<br>0 | Dependent (<br>Count<br>0<br>0<br>0 | Colun<br>Ad<br>4<br>4<br>4<br>4<br>4<br>4<br>4 |

8. In the Define Group Mask screen, select the Format Type **Substitute**. By selecting Substitute, you are defining a deterministic mask—allowing a consistent masking across databases for these columns selected.

| Define Group Mask |                          |                     |                   |          |
|-------------------|--------------------------|---------------------|-------------------|----------|
|                   | Database db04.oracle.com | Logged In As system |                   | ancel OK |
|                   | Owner HR                 | Table EMPLOYEES     |                   |          |
| Format Type       |                          |                     |                   |          |
|                   | Shuffle                  |                     | Preserve Original |          |
| Column            | Substitute               | Data Type           | Data              | Remove   |
| PHONE_NUMBER      | Table Column             | VARCHAR2(20)        |                   | 2        |
| CITY              | User Defined Function    | VARCHAR2(30)        |                   | 2        |
| STREET_ADDRESS    |                          | VARCHAR2(40)        |                   |          |
| COUNTRY_ID        |                          | CHAR(2)             |                   | 2        |
| POSTAL_CODE       |                          | VARCHAR2(12)        |                   | 2        |



9. Type **HR.MASK\_ADDRESSES** in the Masking Table and click on the **Go** button. Select the corresponding Masking Columns from the drop-down list boxes and click on the **OK** button to continue.

| Define Group Mask | Database <b>db04.oracle.com</b><br>Owner <b>HR</b> | Logged In As system Cancel<br>Table EMPLOYEES |                   |        |  |  |
|-------------------|--|---|-------------------|--------|--|--|
| Format Type       | Substitute   | 10  |                   |        |  |  |
|                   |  |   | Preserve Original |        |  |  |
| Column            | Data Type  | Masking Column                                | Data              | Remove |  |  |
| PHONE_NUMBER      | VARCHAR2(20)                                       | PHONE_NUMBER (VARCHAR2(25))                   |                   |        |  |  |
| CITY              | VARCHAR2(30)                                       | CITY (VARCHAR2(30))                           |                   | 1      |  |  |
| STREET_ADDRESS    | VARCHAR2(40)                                       | STREET_ADDRESS (VARCHAR2(40))                 |                   | 1      |  |  |
| COUNTRY_ID        | CHAR(2)  | COUNTRY_ID (CHAR(2))                          |                   | 1      |  |  |
| POSTAL_CODE       | VARCHAR2(12)                                       | POSTAL_CODE (VARCHAR2(10))                    |                   | 2      |  |  |

10. As an option, open another tab on your browser window and view the full contents of the **HR.MASK\_ADDRESSES** table. We have provided a screen shot so you can see a sample of the data.

| View Data | for Table: HR.MASK_AD    | DRESSES                         |             |                |                  |                           |
|-----------|--------------------------|---------------------------------|-------------|----------------|------------------|---------------------------|
|           |                          |                                 |             |                |                  | Refine Query OK           |
| Query     | SELECT 'PHONE_NUMBER', " | STREET_ADDRESS', 'CITY', 'STATE | _PROVINCE', |                |                  |                           |
|           | "POSTAL_CODE", "COUNTRY_ | ID' FROM 'HR'.'MASK_ADDRESSES'  |             |                |                  |                           |
|           |                          |                                 |             |                |                  |                           |
|           |                          |                                 |             |                |                  |                           |
| Result    |                          |                                 |             |                | C Denviewe 1 05  | -1210 A New 05 @          |
|           |                          |                                 |             |                | © Previous [1-20 | 51319 - <u>INEXT 25</u> @ |
|           | PHONE_NUMBER             | STREET_ADDRESS                  | СПУ         | STATE_PROVINCE | POSTAL_CODE      | COUNTRY_ID                |
|           | +1 412 123 4662          | 2455 Rose Garden Rd             | Pittsburgh  | PA             | 15220            | US                        |
|           | +1 610 123 4664          | 141 Schiller St                 | Reading     | PA             | 19601            | US                        |
|           | +1 610 123 4667          | 1126 Pawlings Rd                | Norristown  | PA             | 19403            | US                        |
|           | +1 610 123 4669          | 55 Church Hill Rd               | Reading     | PA             | 19606            | US                        |
|           | +1 717 123 4674          | 354 N Prince St                 | Lancaster   | PA             | 17603            | US                        |
|           | +1 412 123 4681          | 2899 Grand Ave                  | Pittsburgh  | PA             | 15225            | US                        |
|           | +1 412 123 4684          | Po Box 39                       | Indiana     | PA             | 15701            | US                        |
|           | +1 412 123 4688          | 1604 Broadway Ave               | Pittsburgh  | PA             | 15216            | US                        |
|           | +1 412 123 4691          | 4734 Liberty Ave                | Pittsburgh  | PA             | 15224            | US                        |
|           | +1 717 123 4692          | 21 Thornwood Rd                 | Harrisburg  | PA             | 17112            | US                        |
|           | +1 814 123 4697          | 1808 4Th Ave                    | Altoona     | PA             | 16602            | US                        |
|           | +1 412 123 4700          | Station Sq                      | Pittsburgh  | PA             | 15219            | US                        |

11. Notice that all of the Formats have all been defined. At this step, you could continue to add to your Masking Definition. To finish creating a Masking Definition, click the **OK** button.

| reate   | Masking Def        | inition                        |                             |                          |                                |                   |                           |                |              |
|---------|--------------------|--------------------------------|-----------------------------|--------------------------|--------------------------------|-------------------|---------------------------|----------------|--------------|
|         |                    |                                |                             |                          |                                |                   |                           | Canc           | el) OK       |
|         |                    | * Name                         | HR_COMPOUND_MASK            |                          |                                |                   |                           |                |              |
|         |                    | * Database                     | db04.oracle.com             |                          |                                | <i>3</i> 7        |                           |                |              |
|         |                    | Description                    | Compound Mask of HR Da      | ata                      |                                |                   |                           |                |              |
| Colur   | nns                |                                |                             |                          |                                |                   |                           |                |              |
| Add co  | olumns you want to | o mask and define masking      | format for each column. For | reign key columns are a  | automatically added to maintai | in referential ir | ntegrity. Dependent colum | ns are columns |              |
| that do | not have foreign   | key constraints defined, but   | reference a masked column   | n due to application lev | el constraints. You can manua  | Ily add depen     | dent columns to a masked  | column.        | A stat       |
| Hemo    | ring a column from | this list will remove all fore | ign key and dependent colur | nns.                     |                                |                   |                           |                | Add          |
| ( Re    | move               |                                |                             |                          |                                |                   |                           |                |              |
| Select  | All Select None    |                                |                             |                          |                                |                   |                           |                |              |
|         |                    |                                |                             |                          |                                |                   |                           | Dependent      | Columns      |
| Selec   | t Owner            | Table                          | Column                      | Column Group             | Data Type                      | Format            | Foreign Key Columns       | Count          | Add          |
|         | HR                 | EMPLOYEES                      | PHONE_NUMBER                | 1                        | VARCHAR2(20)                   | -                 | 0                         | 0              | <del>የ</del> |
|         | HR                 | EMPLOYEES                      | СІТҮ                        | 1                        | VARCHAR2(30)                   | 8                 | o                         | 0              | ቍ            |
|         | HR                 | EMPLOYEES                      | STREET_ADDRESS              | 1                        | VARCHAR2(40)                   | -                 | 0                         | 0              | ቀ            |
|         | HR                 | EMPLOYEES                      | COUNTRY_ID                  | 1                        | CHAR(2)                        | 8                 | 0                         | 0              | ÷            |
|         | HR                 | EMPLOYEES                      | POSTAL_CODE                 | 1                        | VARCHAR2(12)                   | 2                 | 0                         | 0              | ቍ            |

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Cancel

12. You will be brought back to the Data Masking Definitions page. Select the **HR\_COMPOUND\_MASK** and click on the **Generate Script** button.

The masking script is being generated. This process may take up to 15 minutes to complete

| Data Masking Definitions<br>Data masking is the process of making sensitive inf<br>masking definition defines the columns to be mask<br>contains a collection of ready-to-use masking form | formation in test or non-<br>ed and the format of ma<br>ats. | production databases safe. It disguises<br>sked data. You can create a new mask | sensitive information by overwriting it with<br>ing definition or use an existing definition fo | ealistic looking but false data of a similar type. A<br>r a masking operation. The Format Library |
|--|--|---|---|---|
| Search Masking Definition 🖨  |  | ] 💿   |   | (Import) Create   |
| View Edit Generate Script Schedule   | Job Delete Action  | s Clone Database 🖨 Go   |   |   |
| Select Masking Definition 🛆  | Database   | Description   | Columns Status  | Most Recent Job Ended   |
| HR COMPOUND MASK   | db04.oracle.com  | Compound Mask of HR Data  | 5 Script Not Generated  |   |
| SIMPLE EMPLOYEE DATA MASK  | db04.oracle.com  | Mask Employee Data  | 6 Masking Job Succeeded   | Jul 27, 2010 9:57:00 PM GMT+00:00   |
| Processing: Generating Data  | Masking Script   |   |   |   |
| Database db04.orar   | cle.com  | Numbe   | er of Tables 1  | Cancel  |
| Logged in As system  |  |   | Columns 5   |   |

0

| 13. | After the data masking script generation has completed successfully, scroll down the |
|-----|--|
|     | page and expand the Impact Report section. Choose to save the script to disk for     |
|     | additional review by clicking on the Save Full Script button.                        |

| ( D) Information  |   |                           |                  |
|---|---|---------------------------|------------------|
| Data masking script generation completed successfully.  |   |                           |                  |
|   |   |                           |                  |
| Script Generation Results: HR_COMPOUND_MASK   |   |                           |                  |
| Database db04.oracle.com  | Number of Tables 1  |                           | Return           |
| Logged In As system   | Columns 5   |                           |                  |
| Script Options  |   |                           |                  |
| Use script to clone and mask the database. Clone And Mask                                       |   |                           |                  |
| Schedule the data masking job. The script will be executed by the job to perform the masking of | peration, (Schedule Job)                                      |                           |                  |
| 51 , , , , , , , , , , , , , , , , , , ,  |   |                           |                  |
| ▼ Script  |   |                           |                  |
| The script summary is a list of the database commands that will be used to mask the selected    | columns. The full script is a PL/SQL script that includes fun | ctions, procedures, and ( | Save Full Script |
| other commands needed during the masking operation. The full script will be executed by the     | ob to perform the masking operation.                          |                           |                  |
| View 💿 Script Summary 🔿 Full Script   |   |                           |                  |
| Target database: db04.oracle.com  |   |                           |                  |
| Script generated at: 27-JUL-2010 22:18  |   | =                         |                  |
| COMMIT  |   | -                         |                  |
| ALTER SESSION ENABLE PARALLEL DML   |   |                           |                  |
| DROP TABLE 'MGMT_DM_TT_19' PURGE  |   |                           |                  |
| declare   |   |                           |                  |
| adj number:=0;  |   |                           |                  |
| num number:=0;  |   |                           |                  |

- 14. Before executing the newly created compound data masking script as we have done previously, open up another browser tab to query the before state of the **HR.EMPLOYEES** table we will be masking.
- 15. Click on the Schedule Job button to execute the newly created data mask immediately schedule and run the masking operation. Provide and confirm a Substitute Format Seed, for example, string "123456". Provide the Host Credentials using the user: Oracle and the provided password. Click on the Submit button to execute the job.



| Database<br>Logged In As                       | db04.oracle.com<br>system    |             | Number of Tables 1 (Cancel) (Submit<br>Columns 5 |
|--|------------------------------|-------------|--|
|  | ىل∗                          | ob Name     | MASKING_JOB_18                                   |
|  | Job De                       | escription  |  |
|  | * Script File                | Location    | /u01/oracle/product/11.2.0/dbhome_1/dbs          |
|  | <ul> <li>Script F</li> </ul> | ile Name    | masking 18.sql                                   |
| Substitute Format Seed                         |                              |             |  |
| A seed is required for masking definitions the | at use the Substitute        | e format. T | he seed can be any text string.                  |
|  | * Seed                       |             | •  |
|  | * Confirm Seed               |             | •  |
| Host Credentials                               |                              |             |  |
|  | * Username                   | oracle      |  |
|  | * Password                   |             |  |
|  |                              | Save a      | as Preferred Credential                          |
| Start  |                              |             |  |
| Immediately                                    |                              |             |  |
| OLater   |                              |             |  |
| Jul 27, 2010                                   |                              |             |  |

16. Once you submit the job, you will be forwarded to a confirmation page that the job was submitted successfully.

| Job Submitted Successfully     Data Masking job has been submitted successfully. Click on the View Job Details link below to view execution status. <u>View Job Details</u>   |                                  |                         |                         |                                   |  |  |  |  |  |  |
|---|----------------------------------|-------------------------|-------------------------|-----------------------------------|--|--|--|--|--|--|
| Data Masking Definitions  |                                  |                         |                         |                                   |  |  |  |  |  |  |
| Data masking is the process of making sensitive information in test or non-production databases safe. It disguises sensitive information by overwriting it with realistic looking but take data of a similar type.<br>A masking definition defines the columns to be masked and the format of masked data. You can create a new masking definition or use an existing definition for a masking operation. The Format Library contains a collection of ready-to-use masking formats. |                                  |                         |                         |                                   |  |  |  |  |  |  |
| (View) (Edit) (Generate Script) (Sche   | dule Job) Delete) Actio          | ons Clone Database 🗘 Go |                         |                                   |  |  |  |  |  |  |
| Select Masking Definition 🛆   | Database                         | Description             | Columns Status          | Most Recent Job Ended             |  |  |  |  |  |  |
| HR COMPOUND MASK  | HR COMPOUND MASK db04.oracle.com |                         | 5 Masking Job Scheduled |                                   |  |  |  |  |  |  |
| SIMPLE EMPLOYEE DATA MASK db04.oracle.com   |                                  | Mack Employee Data      | 6 Masking Job Supported | HI 27, 2010 9-57:00 RM CMT (00:00 |  |  |  |  |  |  |

#### 17. Click on the **GO** button to refresh the status of the job.

| Data Masking Definitions  |                                      |                          |                       |                                   |                                    |  |  |  |  |
|---|--------------------------------------|--------------------------|-----------------------|-----------------------------------|------------------------------------|--|--|--|--|
| Data masking is the process of making sensitive information in test or non-production databases safe. It disguises sensitive information by overwriting it with realistic booking but false data of a similar type. A masking definition defines the columns to be masked and the format of masked data. You can create a new masking definition or use an existing definition for a masking operation. The Format Library contains a collection of ready-to-use masking formats. |                                      |                          |                       |                                   |                                    |  |  |  |  |
| Search Database 🗘 'db04.oracie.com  | Search Database 🗘 I'db04.oracle.com' |                          |                       |                                   |                                    |  |  |  |  |
| View Edit Generate Script Schedule Jo   | b Delete Action                      | s Clone Database 🖨 Go    |                       |                                   |                                    |  |  |  |  |
| Select Masking Definition 🛆   | Database                             | Description              | Columns               | Status                            | Most Recent Job Ended              |  |  |  |  |
| HR COMPOUND MASK  | db04.oracle.com                      | Compound Mask of HR Data | 5                     | Masking Job Succeeded             | Jul 27, 2010 10:31:33 PM GMT+00:00 |  |  |  |  |
| O SIMPLE EMPLOYEE DATA MASK   | db04.oracle.com                      | 6                        | Masking Job Succeeded | Jul 27, 2010 9:57:00 PM GMT+00:00 |                                    |  |  |  |  |

18. Once the job successfully completes, follow the provided steps again to create a new tab and query the masked data for a before and after comparison. View the data before the compound masking operation for the **HR.EMPLOYEES** table.



| GRACLE L<br>Grid Control | ntegurise Manager 10p  | Inclusions 1                                 | Services I Su                            | stems I. Grouns I. Al                                       | II Turcetti  |            |        |                  |              |                         | Home                  | apets Deployme | site Aere     | Compliance  | jobs Reports          |
|--------------------------|--|--|--|---|--|------------|--------|------------------|--------------|-------------------------|-----------------------|----------------|---------------|-------------|-----------------------|
| Trease   Loan            | cases   modemate   reco  | debening in 1                                |  | active L cacedre 1 se                                       |  |            |        |                  |              |                         |                       |                |               |             | and in the Contractor |
| CORDERED THE PROPERTY    | data oracia.com > 11000 >  |  |  |   |  |            |        |                  |              |                         |                       |                |               |             | aggeon as a ranar     |
| View Data f              | or Table: HR.EMPLOYE   | ES   |  |   |  |            |        |                  |              |                         |                       |                |               |             | Entry Ourse Of        |
| Query                    | SELECT HAPLONEE_ID; F1<br>JOB_ID; SALARY, COMM<br>STREET_ACORESS; POSTA<br>HR: HAPLONEES | rst_n4me, 1<br>Issión PCT, 1<br>4L_CODE, 101 | .ast_name;<br>Manager_ic<br>TV; *state_f | 'Email', 'Phone_n<br>2, 'department_ic<br>Rovince', "Counte | LIMBER', 'HIRE_DATE',<br>), 'HATIONAL_ID',<br>RY_ID'FROM |            |        |                  |              |                         |                       |                |               |             | COLUMN COL            |
| Result                   |  |  |  |   |  |            |        |                  |              |                         |                       |                | O Previous    | 1-25 of 107 | A Next 25 @           |
|                          | IMPLOYEE ID REST NAME  | E LAST NAMI                                  | EBMAIL                                   | PHONE NUMBER  | HIRE DATE  | JOB ID     | SALARY | COMMISSION PCT I | ANAGER ID    | DEPARTMENT IDNATIONAL I | STREET ADDRESS        | POSTAL CODE    | CITY          | STATE PROMN | CE COUNTRY ID         |
|                          | 2034 139007 Maurice  | Broderick                                    | 4R4ND4                                   | +1 012 123 4408   | 2000-04-21.00:00:00.0                                    | SA REP     | 3000   | 1                | 4001939020   | 80 548-304-102          | 113N 19.9             | 55401          | Minneapois    | MN          | LIS                   |
|                          | 6453363033 Keir  | Bakhvin                                      | ABLLL                                    | +1 412 123 4084   | 1997-02-20 00:00:00.0                                    | SH CLERK   | 8000   |                  | 9750595016   | 50 932-32-5187          | Po Box 39             | 15701          | Indiana       | PA          | US                    |
|                          | 7383515104 Dianne  | Bakhvin                                      | ACABBIO                                  | +1 414 123 4373   | 1999-02-07 00:00:00.0                                    | SH CLERK   | 7300   |                  | 9750595016   | 50 259-45-1395          | 300 Crooks St         | 54301          | Green Bay     | W           | US                    |
|                          | 466 1939020 Gerard   | Barkin                                       | AERBAZUR                                 | +1 507 123 4387   | 1997-03-10 00:00:00.0                                    | SA MAN     | 9500   | .3               | 1227795000   | 80 240-648-435          | 205 S Broadway # 707  | 55904          | Rochester     | MN          | US                    |
|                          | 9750595010 Keir  | Danson                                       | AFRIPP                                   | +1814 123 4755  | 1997-04-10 00:00:00.0                                    | ST MAN     | 9000   |                  | 1227795000   | 50 349-86-1018          | RtoE                  | 10305          | Warren        | PA          | US                    |
|                          | 4993928089 Marlon  | Chapman                                      | AHUNOLD                                  | +1 301 123 48 18  | 1990-01-03 00:00:00.0                                    | IT PROG    | 7900   |                  | 6312922035   | 00 489-40-0150          | 11200 Scaggs de Rd    | 20723          | Laurel        | MD          | US                    |
|                          | 4049173053 Rufus   | Brown  | AHUTTON                                  | +1710 123 4450  | 1997-03-19 00:00:00.0                                    | SA REP     | 7000   | .25              | 8847705030   | 80 527-533-784          | 255 Great Arrow Ave   | 14207          | Buffalo       | NY          | US                    |
|                          | 737 1933070 Marlon   | Chapman                                      | 49100                                    | +91 80 012 3711   | 1995-05-18 00:00:00.0                                    | PU CLERK   | 8400   |                  | 8253800057   | 30 832-78-4308          | 1004 Volunteers Rd    | 301121         | Bangakre      | Kar         | IN                    |
|                          | 4602834076 Ken   | Clevennd                                     | ALICEMEN                                 | +1414 123 4376  | 1995-08-01 00:00:00.0                                    | SA REP     | 7900   | .35              | 4258 540074  | 80 118-308-551          | 633 S Hawley Rd       | 53214          | Minaukee      | W           | US                    |
|                          | 2880700080 Daniel  | Edwards                                      | AWALSH                                   | +39 10 012 4379   | 1998-04-24 00:00:00.0                                    | SH CLERK   | 8400   |                  | 7278130071   | 50 005-41-9225          | Via Notoriosa 1932    | 361232         | Telaro        |             | IT                    |
|                          | 9487844007 Maurice   | Dalrey                                       | BERNST                                   | +39 55 012 4555   | 1991-05-21 00:00:00.0                                    | IT PROG    | 8800   |                  | 4993928089   | 50 938-76-5847          | Via Notoriosa 1941    | 351199         | Frenze        |             | IT                    |
|                          | 7322191048 Maureen   | Dunaway                                      | BE\ERETT                                 | +91 80 012 4803   | 1997-03-03 00:00:00.0                                    | SH CLERK   | 8200   |                  | 7535932001   | 50 791-96-1878          | 1002 Shoky St         |                | Chennai       | Tam         | IN                    |
|                          | 4745937072 Gulhume   | Boyer  | CDA\IES                                  | +91 80 012 37 11  | 1997-01-29 00:00:00.0                                    | ST CLERK   | 8400   |                  | 7278 13007 1 | 50 349-79-8367          | 1604 Volunteers Rd    | 361121         | Bangakre      | Kar         | IN                    |
|                          | 8 539 1920 10 Meenalshi  | Bel Geddes                                   | CJOHNSON                                 | +39 49 012 4409   | 2000-01-04 00:00:00.0                                    | SA REP     | 3000   | .1               | 8847705030   | 80 551-594-595          | Via Del Disegno 194   | 361223         | San Giminiano |             | IT                    |
|                          | 9959323005 Cubi  | Eastwood                                     | COLSEN                                   | +91 80 012 4889   | 1998-03-30 00:00:00.0                                    | SA REP     | 68.00  | .2               | 9777678073   | 80 005-497-995          | 1647 Suspense St      | 301108         | Cochin        | Ker         | IN                    |
|                          | 8990271042 Harrison  | Capshaw                                      | CVISHNEY                                 | +1 518 123 4474   | 1997-11-11 00:00:00.0                                    | SA REP     | 4000   | .25              | 4001939020   | 80 397-955-159          | 137 Lark St           | 12210          | Abany         | NY          | US                    |
|                          | 3876018068 Rob   | Brando                                       | DALISTIN                                 | +39 6 012 4507  | 1997-08-25 00:00:00.0                                    | IT PROG    | 7200   |                  | 4993928089   | 60 125-59-4295          | Plazza Suizzera       | 301187         | Roma          |             | IT                    |
|                          | 9232146004 Rob   | Broderick                                    | DEERNSTE                                 | +1 745 123 4367   | 1997-03-24 00:00:00.0                                    | SA REP     | 3300   | .25              | 9777678073   | 80 705-511-842          | 1400 Belinger St FI 4 | 54703          | Eau Claire    | W           | US                    |
|                          | 4621106069 Hannah  | Fawoett                                      | DEAMET                                   | +1 215 123 4702   | 1994-08-16 00:00:00.0                                    | FI ACCOUNT | 7900   |                  | 8825487025   | 100 288-25-6748         | 1136 Arch St          | 19107          | Philadelphia  | PA          | US                    |
|                          | 4090678065 Eirabeth  | Boyer  | DGRANT                                   | +1 215 123 4708   | 2000-01-13 00:00:00.0                                    | SH CLERK   | 2500   |                  | 7278 13007 1 | 50 729-65-5030          | 100 N Peach St        | 19139          | Philadelphia  | PA          | US                    |
|                          | 1202703043 Charles   | Brown  | DGREENE                                  | +39 6 012 4391  | 1999-03-19 00:00:00.0                                    | SA REP     | 3300   | .15              | 4661939020   | 80 770-138-191          | Plaza Cachistore 23   | 301184         | Roma          |             | IT                    |
|                          | 4067389062Rob  | Dench  | DLEE                                     | +91 141 012 4895  | 2000-02-23 00:00:00.0                                    | SA REP     | 7700   |                  | 4661939020   | 80 195-458-885          | 1850 Teesri Manji Crt | 301108         | Kashmir       |             | IN                    |
|                          | 6361420056 Harrison  | Buckey                                       | DLOBENTZ                                 | +1 608 123 4374   | 1999-02-07 00:00:00.0                                    | IT PROG    | 3800   |                  | 4993928069   | 60 847-94-8576          | 122 E Davton St       | 53703          | Madison       | W           | US                    |
|                          | 4021080012 Jan   | Belushi                                      | DOCONNEL                                 | +1715 123 4372  | 1999-06-21 00:00:00.0                                    | SH_CLERK   | 2500   |                  | 7278 13007 1 | 50 809-10-4403          | 808 3Rd St # 100      | 54403          | Wausau        | W           | US                    |
|                          | 8253800057 Dianne  | Bradford                                     | DRAPHEAL                                 | +1 612 123 4434   | 1994-12-07 00:00:00.0                                    | PU MAN     | 11000  |                  | 1227795000   | 30 285-86-7296          | 1409 Willow St # 600  | 55403          | Minneapolis   | MN          | US                    |
|                          |  |  |  |   |  | -          |        |                  |              |                         |                       |                | 0.0.1         | Com Long    |                       |

19. View the data after the compound masking operation for the **HR.EMPLOYEES** table.

| Grid Control      | interprise Manager 10p              |              |            |                  |                          |          |                    |      |                       |                | Home  | Octo Deploy | rens Aers I            | Compliance Liebs | Reports           |
|-------------------|-------------------------------------|--------------|------------|------------------|--------------------------|----------|--------------------|------|-----------------------|----------------|---|-------------|------------------------|------------------|-------------------|
| Hosts   Data      | abases   Middleware   Web           | Applications | Services   | Systems   Groups | All Targets              |          |                    |      |                       |                |   |             |                        |                  |                   |
| Database Instance | c db02.oradis.com > <u>Tables</u> > |              |            |                  |                          |          |                    |      |                       |                |   |             |                        | Logg             | ed in As SYSILIAN |
| View Data f       | or Table: HR.EMPLOY                 | EES          |            |                  |                          |          |                    |      |                       |                |   |             |                        |                  |                   |
|                   |                                     |              |            |                  |                          |          |                    |      |                       |                |   |             |                        | Ret              | n: Query) OK)     |
| Query             | SELECT 'EMPLOYEE_ID', F             | IRST_N4ME;   | 1.AST_N4M  | e, 1911al, 1940) | e number , hire          | DATE     |                    |      |                       |                |   |             |                        |                  |                   |
|                   | STREET ADDRESS, POST                | ISSION_PCT   | TTY, STATE | PROVINCE: CO     | UNTRY ID FROM            | D*,      |                    |      |                       |                |   |             |                        |                  |                   |
|                   | HR EMPLOYEES                        |              |            | -                | -                        |          |                    |      |                       |                |   |             |                        |                  |                   |
|                   |                                     |              |            |                  |                          |          |                    |      |                       |                |   |             |                        |                  |                   |
|                   |                                     |              |            |                  |                          |          |                    |      |                       |                |   |             |                        |                  |                   |
| Result            |                                     |              |            |                  |                          |          |                    |      |                       |                |   |             | O Previous (           | 1-25 of 107      | <u>Net 25</u> 🛞   |
|                   | EMPLOYEE_ID RRST_NAME               | ELAST_NAMI   | EBMAIL     | PHONE_NUMBER     | HIRE_DATE                | JOB_ID   | SALARY COMMISSION_ | PCTN | MANAGER_ID DEPARTMENT | [IDNATIONAL]   | OSTREET_ADDREES                             | POSTAL_COD  | ECITY                  | STATE_PROVINC    | ECOUNTRY_ID       |
|                   | 2034139007 Maurice                  | Broderick    | ABANDA     | (925) 555-0035   | 2000-04-21               | SA_REP   | 3000               | -1   | 4661939020            | 80 548-304-162 | Magdalen Centre, The Oxford Science         | 0)ia aZB    | Oxford                 | Oxford           | ик                |
|                   | 6453363033 Keir                     | Bakhain      | ABULL      | (650) 555-1082   | 1997-02-20               | SH_CLERK | 8000               |      | 9750595016            | 50 932-32-5187 | 2011 Interiors Blvd                         | 99238       | South San              | Callonia         | us                |
|                   |                                     |              |            |                  | 00:00:00.0               |          |                    |      |                       |                |   |             | Francisco              |                  |                   |
|                   | 7383515104 Danne                    | Bakhan       | ACABRIO    | (850) 555-4058   | 1999-02-07<br>00:00:00.0 | SH_CLERK | 7300               |      | 9750595016            | 50/253-45-1395 | 2011 Intenors Blvd                          | 99236       | South San<br>Francisco | Calloma          | 1.6               |
|                   | 466 19390 20 Genard                 | Barkin       | AERRAZUR   | (408) 555-2064   | 1997-03-10<br>00:00:00.0 | SA_MAN   | 9500               | .3   | 1227795000            | 80 240-648-435 | Magdalen Centre, The Oxford Science<br>Park | 0)(9 9ZB    | Oxford                 | Oxford           | uk                |
|                   | 9750595016 Keir                     | Danson       | AFRIPP     | (925) 555-3019   | 1997-04-10<br>00:00:00.0 | ST_MAN   | 9000               |      | 1227795000            | 50 349-66-1018 | 2011 Interiors Blud                         | 99235       | South San<br>Francisco | California       | US                |
|                   | 4993928089 Marion                   | Chapman      | AHUNOLD    | (510) 555-2101   | 1990-01-03<br>00:00:00.0 | IT_PROG  | 7900               |      | 6312922035            | 00 489-40-0150 | 2014 Jubberwooky Rd                         | 25192       | Southinke              | Texas            | US                |
|                   | 4049173053 Rufus                    | Brown        | AHUTTON    | (510) 555-1037   | 1997-03-19<br>00:00:00.0 | SA_REP   | 7000               | .25  | 8847705030            | 80 527-033-784 | Magdalen Centre, The Oxford Science<br>Park | 0)(9 9ZB    | Oxford                 | Onford           | ик                |
|                   | 737 1933070 Marion                  | Chapman      | #0H00      | (925) 555-4099   | 1995-05-18<br>00:00:00.0 | PU_CLERK | 8400               |      | 8253800057            | 30 832-78-4308 | 2004 Charade Rd                             | 96 199      | Seattle                | Washington       | US                |
|                   | 4602834076 Ken                      | Cleveland    | ANCEMEN    | (510) 555-3073   | 1995-08-01<br>00:00:00.0 | SA_REP   | 7900               | .35  | 4208540074            | 80 118-308-551 | Magdalen Centre, The Oxford Science<br>Park | 0)(9 9ZB    | Oxford                 | Oxford           | ик                |
|                   | 2880766086 Daniel                   | Edwards      | AWALSH     | (510) 555-2009   | 1998-04-24<br>00:00:00.0 | SH_CLERK | 8400               |      | 7278130071            | 50 005-41-9225 | 2011 Interiors Blvd                         | 99236       | South San<br>Francisco | Callonia         | US                |
|                   | 9487844067 Maurice                  | Dairey       | BERNIST    | (925) 555-7083   | 1991-05-21<br>00:00:00.0 | IT_PROG  | 8800               |      | 4993928089            | 60 938-76-5847 | 2014 Jubberwooky Rd                         | 26192       | Southlake              | Texas            | US                |
|                   | 7322191048 Maureen                  | Dunaway      | BEVERETT   | (925) 555-7075   | 1997-03-03<br>00:00:00.0 | SH_CLERK | 8.200              |      | 7535932001            | 50 791-96-1878 | 2011 Interiors Blvd                         | 99235       | South San<br>Francisco | Callonia         | US                |
|                   | 4745937072 Gallaume                 | Boyer        | CDA/IES    | (510) 555-3089   | 1997-01-29<br>00:00:00.0 | ST_CLERK | 8400               |      | 7278 13007 1          | 50 349-79-8367 | 2011 Interiors Blvd                         | 99236       | South San<br>Francisco | Callonia         | US                |
|                   | 8 539 1920 10 Meenalahi             | Bel Geddes   | CJOHNBON   | (050) 555-6060   | 2000-01-04<br>00:00:00.0 | SA_REP   | 3000               | -1   | 8847705090            | 80 551-594-595 | Magdalen Centre, The Oxford Science<br>Park | 0009 9ZB    | Oxford                 | Oxford           | uk                |
|                   | 9959323006 Cybil                    | Eastwood     | COLSEN     | (408) 555-3044   | 1998-03-30<br>00:00:00.0 | SA_REP   | 8800               | .2   | 9777678073            | 80 005-497-995 | Magdalen Centre, The Oxford Science<br>Park | 0)/9 97B    | Oxford                 | Oxford           | ик                |

20. Return to the **Data Masking Definition** screen. We will create a new definition in this repository by importing an existing Masking Definition.

| Data Masking Definitions   |                 |                          |                         |                                    |  |  |  |  |  |  |
|--|-----------------|--------------------------|-------------------------|------------------------------------|--|--|--|--|--|--|
| Data masking is the process of making sensitive information in test or non-production databases safe. It disguises sensitive information by overwriting it with realistic boking but false data of a similar type. A masking definition defines the columns to be masked and the format of masked data. You can create a new masking definition or use an existing definition for a masking operation. The Format Library contains a collection of ready-to-use masking formats. |                 |                          |                         |                                    |  |  |  |  |  |  |
| Search Database 🗘 I'db04.oracle.com' Go  |                 |                          |                         |                                    |  |  |  |  |  |  |
| (View) Edit) Generate Script) Schedule Jo  | Delete Action   | s Clone Database 🖨 Go    |                         |                                    |  |  |  |  |  |  |
| Select Masking Definition 🛆  | Database        | Description              | Columns Status          | Most Recent Job Ended              |  |  |  |  |  |  |
| HR COMPOUND MASK   | db04.oracle.com | Compound Mask of HR Data | 5 Masking Job Succeeded | Jul 27, 2010 10:31:33 PM GMT+00:00 |  |  |  |  |  |  |
| O SIMPLE EMPLOYEE DATA MASK  | db04.oracle.com | Mask Employee Data       | 6 Masking Job Succeeded | Jul 27, 2010 9:57:00 PM GMT+00:00  |  |  |  |  |  |  |

21. Click on the **Browse** button to select the Masking Definition.

| Imp  | port Masking Definition: Select File  |        |          |
|------|---|--------|----------|
|      |   | Cancel | Continue |
| Use  | this page to import a masking definition that was previously exported from the Data Masking page. Select the exported file and continue to import masking definition into repository. |        |          |
| File | Browse]   |        |          |



22. Navigate to the folder oracle->Desktop->Labs->11g\_DB\_Security->EM – Data\_Masking ->DM – Lab Exercise 04, and select the file named HR\_CONDITIONAL\_MASK.xml Click on the Open button to continue.

| )                | File Upload             |                     | _         |
|------------------|-------------------------|---------------------|-----------|
| 11g_D0_Security  | EMData_Masking          | DM - Lab Exercise 0 | 94        |
| Location:        |                         |                     | _         |
| Baces            | Name                    | -                   | Modified  |
| 🐞 oracle         | 📁 Cut and Paste for the | Labs                | 05/12/09  |
| 🗬 Desktop        | CONDITIONAL_EMPL        | OYEE_DATA_MASK.xml  | 06/25/10  |
| Sile System      | HR_CONDITIONAL_M        | ASK.xml             | 07/13/09  |
|                  |                         |                     |           |
| ∯ Add 🛛 📾 ßemove |                         |                     | All Files |
|                  |                         | 🗙 <u>C</u> ancel    | 🎾 Open    |

23. Click on the **Continue** button to import the Masking Definition.

| Im   | port Masking Definition: Select File  |        |          |
|------|---|--------|----------|
|      |   | Cancel | Continue |
| Use  | this page to import a masking definition that was previously exported from the Data Masking page. Select the exported file and continue to import masking definition into repository. |        |          |
| File | /home/oracle/Desktop/Labs/EM - Data Masking/DM - Lab Exercise 04/HR_COND  |        |          |
|      |   |        |          |

24. With **CONDITIONAL\_EMPLOYEE\_DATA\_MASK** selected, click on the **Edit** button to begin customizing our conditional format.

| Vie   | View Edit Generate Script Schedule Job Delete Actions Clone Database 🗘 Go |                 |                                  |                         |                                    |  |  |  |  |  |
|-------|---|-----------------|----------------------------------|-------------------------|------------------------------------|--|--|--|--|--|
| Selec | t Masking Definition 🛆  | Database        | Description                      | Columns Status          | Most Recent Job Ended              |  |  |  |  |  |
| ۲     | CONDITIONAL EMPLOYEE DATA MASK  | db04.oracle.com | Mask Employee Data Conditionally | Z Script Not Generated  |                                    |  |  |  |  |  |
| 0     | HR COMPOUND MASK  | db04.oracle.com | Compound Mask of HR Data         | 5 Masking Job Succeeded | Jul 27, 2010 10:31:33 PM GMT+00:00 |  |  |  |  |  |
| 0     | SIMPLE EMPLOYEE DATA MASK   | db04.oracle.com | Mask Employee Data               | 6 Masking Job Succeeded | Jul 27, 2010 9:57:00 PM GMT+00:00  |  |  |  |  |  |

25. For this conditional mask, we want to mask the NATIONAL\_ID column based upon the

**COUNTRY\_ID** column. To configure the **NATIONAL\_ID** column format, click on the

|  | sking Definit   | tion: CONDITIONAL | _EMPLOYEE_DAT          | A_MASK       |               |          |                     |             |         |  |
|--|-----------------|-------------------|------------------------|--------------|---------------|----------|---------------------|-------------|---------|--|
|  |                 | . Norma           |                        |              | ]             |          |                     | Cance       | el) (OK |  |
|  |                 | * Name            | CONDITIONAL_EMPLOYI    | EE_DATA_MASK |               | ~        |                     |             |         |  |
|  |                 | * Database        | db04.oracle.com        |              |               | <i>S</i> |                     |             |         |  |
|  |                 | Description       | Mask Employee Data Con | ditionally   |               |          |                     |             |         |  |
| Columns  |                 |                   |                        |              |               |          |                     |             |         |  |
| that do not have foreign key constraints defined, but reference a masked column due to application level constraints. You can manually add dependent columns to a masked column.  Removing a column from this list will remove all foreign key and dependent columns.  Add  Remove |                 |                   |                        |              |               |          |                     |             |         |  |
| Select /   | All Select None |                   |                        |              |               |          |                     |             |         |  |
|  |                 |                   |                        |              |               |          |                     | Dependent ( | Columns |  |
| elect  | Owner           | Table             | Column                 | Column Group | Data Type     | Format   | Foreign Key Columns | Count       | Add     |  |
|  | HR              | EMPLOYEES         | COUNTRY_ID             |              | CHAR(2)       | ÷.       | 0                   | 0           | ቍ       |  |
|  | HR              | EMPLOYEES         | EMPLOYEE_ID            |              | NUMBER        | -        | 5                   | 1           | ቍ       |  |
|  | HR              | EMPLOYEES         | FIRST_NAME             |              | VARCHAR2(20)  | -        | 0                   | o           | ф       |  |
|  | HR              | EMPLOYEES         | LAST_NAME              |              | VARCHAR2(25)  | 8        | 0                   | 0           | ቍ       |  |
|  | HR              | EMPLOYEES         | NATIONAL_ID            |              | VARCHAR2(100) | 13       | 0                   | 0           | ቍ       |  |
|  |                 |                   |                        |              |               | -        | -                   |             |         |  |

To avoid typing errors, navigate the lab folders to access a text document with the correct SQL conditional text. Navigate the folders oracle->Desktop->Labs >11g\_DB\_Security->EM – Data\_Masking ->DM – Lab Exercise 04.





27. Double click on the icon **Cut and Paste for the Labs** document and open up in the emacs editor. This SQL will be used to evaluate our conditions for proper masking.

| dm_sqi_cut_and_paste (~/dm_scripts) - gedit   |     |
|---|-----|
| <u>File Edit View Search Tools Documents H</u> eip  |     |
| Image: Weight of the second |     |
| 🕼 dm_sql_cut_and_paste 🗙  |     |
| <pre>*** NATIONAL_ID CONDITIONAL MASKING EXAMPLE *** national_id in (select national_id from hr.employees where country_id = 'CA')</pre>  |     |
| <pre>national_id in (select national_id from hr.employees where country_id = 'UK') national_id in (select national_id from hr.employees where country_id = 'UK')</pre>  |     |
| <pre>### CREDIT CARD CONDITIONAL MASKING EXAMPLE ***</pre>  | =   |
| <pre>credit_card_type in (select e.credit_card_type from oe.customers e where<br/>e.credit_card_type = 'VISA')</pre>  |     |
| <pre>credit_card_type in (select e.credit_card_type from oe.customers e where<br/>e.credit_card_type = 'MASTER CARD')</pre>   |     |
| Ln 10, Col 1  | INS |

28. In the **Define Column Mask** screen, click on the **Add Condition** button. We will be adding 3 conditions based upon the SQL to test for the **COUNTRY\_ID** value.

| Import Format Format Entry Array List | bbA)     |       |          |       |        | Add | I Condition |
|---------------------------------------|----------|-------|----------|-------|--------|-----|-------------|
| Expand All Collapse All               |          |       |          |       |        |     |             |
| Format Entry Properties               |          |       |          |       |        |     |             |
| Select Condition                      | Property | Value | Property | Value | Sample |     | Remove      |
| Conditions                            |          |       |          |       |        |     |             |
| Oefault Condition                     |          |       |          |       |        |     |             |
| (Add a format entry)                  |          |       |          |       |        |     |             |
|                                       |          |       |          |       |        | Can | cel OK      |

- 29. Type (cut and paste) the following SQL Condition and click on the Import Format button.
  - national\_id in (select national\_id from hr.employees where country\_id = 'CA')



| Import Format Entry Array List            | udd)     |            |               |       | Add    | Condition |
|---|----------|------------|---------------|-------|--------|-----------|
| Expand All Collapse All                   |          |            |               |       |        |           |
|   |          | Format Ent | ry Properties |       |        |           |
| Select Condition                          | Property | Value      | Property      | Value | Sample | Remove    |
| Conditions                                |          |            |               |       |        |           |
| I = c.country_id and c.country_id = 'CA') |          |            |               |       |        | Z         |
| (Add a format entry)                      |          |            |               |       |        |           |
| O V Default Condition                     |          |            |               |       |        |           |
| (Add a format entry)                      |          |            |               |       |        |           |
|   |          |            |               |       | Can    | el OK     |

30. If the condition is met that the **COUNTRY\_ID** value is '**CA**', then we will use the Canadian **Social Insurance Number Formatted** provided out of the box with the product. Select the corresponding radio button and click on the **Import** button.

| Import Format                                     |                         |  |                 |
|---|-------------------------|--|-----------------|
| Database db02.oraci<br>Owner HR<br>Table EMPLOYEE | e.com<br>ES             | Logged In As system<br>Column NATIONAL_ID<br>Data Type VARCHAR2(100) | Cancel (Import) |
| Search  |                         |  |                 |
| Name  |                         |  |                 |
| Owner   |                         |  |                 |
| Search  |                         |  |                 |
|   |                         |  |                 |
| O National Insurance Number Formatted             | Character BB 37 17 11 B | Generates unique UK National Insurance Numbers                       | SYSMAN          |
| O Social Insurance Number                         | Character 562731000     | ~1 billion unique Canadian Social Insurance Numbers                  | SYSMAN          |
| Social Insurance Number Formatted                 | Character 972-921-308   | ~1 billion unique Canadian Social Insurance Numbers                  | SYSMAN          |
| Social Security Number Formatted                  | Character 154-29-2480   | ~718 million unique US Social Security Numbers                       | SYSMAN          |

31. Review the Masking Format. Click on the Sample icon 🖹 to view sample data and continue by clicking the **Add Condition** button.

|   |              |            |               |           |            | Add Condition |
|---|--------------|------------|---------------|-----------|------------|---------------|
| Import Format Format Entry Array List       | Add          |            |               |           |            |               |
| Expand All Collapse All                     |              |            |               |           |            |               |
|   |              | Format Ent | ry Properties |           |            |               |
| Select Condition                            | Property     | Value      | Property      | Value     | Sample     | Remove        |
| Conditions                                  |              |            |               |           |            |               |
| Inational_id in (select e.national_id from) |              |            |               |           | 530-752-60 | 7             |
| Random Digits                               | Start Length | 8          | End Length    | 8         |            | 2             |
| Post-Processing Function                    | Package Name | DBSNMP.DM  | Function Name | MGMT_DM_G |            | Z             |
| <ul> <li>Vertication</li> </ul>             |              |            |               |           |            |               |
| (Add a format entry)                        |              |            |               |           |            |               |
|   |              |            |               |           |            | Cancel OK     |

- 32. Add the second Conditional Masking definition. Type (cut and paste) the following SQL Condition and click on the **Import Format** button.
  - national\_id in (select national\_id from hr.employees where country\_id = 'UK')



|   |              |            |               |             | Add         | d Condition ) |
|---|--------------|------------|---------------|-------------|-------------|---------------|
| Format Entry Array List                     |              |            |               |             |             |               |
| Expand All Collapse All                     |              |            |               |             |             |               |
|   |              | Format Ent | ry Properties |             |             |               |
| Select Condition                            | Property     | Value      | Property      | Value       | Sample      | Remove        |
| Conditions                                  |              |            |               |             |             |               |
| I = c.country_id and c.country_id = 'UK'    |              |            |               |             |             | 7             |
| (Add a format entry)                        |              |            |               |             |             |               |
| Inational_id in (select e.national_id from) |              |            |               |             | 530-752-609 | 2             |
| Random Digits                               | Start Length | 8          | End Length    | 8           |             | 7             |
| Post-Processing Function                    | Package Name | DBSNMP.DM  | Function Name | MGMT_DM_G 🚀 | •           | 7             |
| O Vefault Condition                         |              |            |               |             |             |               |
| (Add a format entry)                        |              |            |               |             |             |               |
|   |              |            |               |             | Can         | icel OK       |

33. If the condition is met that the **COUNTRY\_ID** value is '**UK**', then we will use the **National Insurance Number Formatted** provided out of the box with the product. Select the corresponding radio button and click on the **Import** button.

| Impo   | ort Format                           |           |  |  |        |
|--|--------------------------------------|-----------|--|--|--------|
| Database <b>db02.oracle.com</b><br>Owner <b>HR</b><br>Table <b>EMPLOYEES</b> |                                      |           | Logged In As system<br>Column NATIONAL_ID<br>Data Type VARCHAR2(100) | (Cancel) (Import)                              |        |
| Se   | earch                                |           |  |  |        |
|  | Name                                 |           |  |  |        |
|  | Owner                                |           |  |  |        |
|  | Search                               |           |  |  |        |
|  |                                      |           |  |  |        |
| С  | Generic Credit Card Number           | Character | 6011131505923026   | ~10 billion unique generic credit card numbers | SYSMAN |
| С  | Generic Credit Card Number Formatted | Character | 2149-6282-4889-1091  | ~10 billion unique generic credit card numbers | SYSMAN |
|  |                                      |           |  |  |        |

| 0 | Generic Credit Card Number           | Character | 6011131505923026    | ~ to billion unique generic credit card numbers     | STSMAN |
|---|--------------------------------------|-----------|---------------------|---|--------|
| С | Generic Credit Card Number Formatted | Character | 2149-6282-4889-1091 | ~10 billion unique generic credit card numbers      | SYSMAN |
| 0 | National Insurance Number Formatted  | Character | CC 05 64 42 C       | Generates unique UK National Insurance Numbers      | SYSMAN |
| С | Social Insurance Number              | Character | 192286102           | ~1 billion unique Canadian Social Insurance Numbers | SYSMAN |
| С | Social Insurance Number Formatted    | Character | 006-036-701         | ~1 billion unique Canadian Social Insurance Numbers | SYSMAN |
| 0 | Social Security Number Formatted     | Character | 669-73-4130         | ~718 million unique US Social Security Numbers      | SYSMAN |

34. Review the Masking Format. Click on the Sample icon 🖹 to view sample data and continue by clicking the **Add Condition** button.

|   |                |               |               |             | A               | dd Condition |
|---|----------------|---------------|---------------|-------------|-----------------|--------------|
| (Import Format) Format Entry Array List     | Add            |               |               |             |                 |              |
| Expand All Collapse All                     |                |               |               |             |                 |              |
|   |                | Format Ent    | ry Properties |             |                 |              |
| Select Condition                            | Property       | Value         | Property      | Value       | Sample          | Remove       |
| ▼ Conditions                                |                |               |               |             |                 |              |
| Inational_id in (select e.national_id from) |                |               |               |             | GG 83 85 44 A 💦 | 2            |
| Array List                                  | List of Values | A,B,C,E,G,H,J |               |             |                 | 2            |
| Array List                                  | List of Values | A,B,C,E,G,H,J |               |             |                 | 2            |
| Random Digits                               | Start Length   | 6             | End Length    | 6           |                 | 2            |
| Array List                                  | List of Values | A,B,C,D       |               |             |                 | 2            |
| Post-Processing Function                    | Package Name   | DBSNMP.DM     | Function Name | MGMT_DM_G 🚀 | >               | 2            |
| Inational_id in (select e.national_id from) |                |               |               |             | 530-752-609     | 2            |
| Random Digits                               | Start Length   | 8             | End Length    | 8           |                 | 2            |
| Post-Processing Function                    | Package Name   | DBSNMP.DM     | Function Name | MGMT_DM_G 🚀 | •               | 7            |
| <ul> <li>Tefault Condition</li> </ul>       |                |               |               |             |                 |              |
| (Add a format entry)                        |                |               |               |             |                 |              |
| Import Format Format Entry Array List       | Add            |               |               |             |                 |              |
|   |                |               |               |             | C               | ancel OK     |

- 35. Add the third Conditional Masking definition. Type (cut and paste) the following SQL Condition and click on the **Import Format** button.
  - national\_id in (select national\_id from hr.employees where country\_id = 'US')

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|   |                         | -          |               |       |               |             |  |  |  |
|---|-------------------------|------------|---------------|-------|---------------|-------------|--|--|--|
| Import Format Entry Array List              | Add)                    |            |               |       | (Add          | Condition ) |  |  |  |
| Expand All Collapse All                     | Expand All Collapse All |            |               |       |               |             |  |  |  |
|   |                         | Format Ent | ry Properties |       |               |             |  |  |  |
| Select Condition                            | Property                | Value      | Property      | Value | Sample        | Remove      |  |  |  |
| Conditions                                  |                         |            |               |       |               |             |  |  |  |
|   |                         |            |               |       |               | 7           |  |  |  |
| (Add a format entry)                        |                         |            |               |       |               |             |  |  |  |
| Inational_id in (select e.national_id from) |                         |            |               |       | GG 83 85 44 A | 2           |  |  |  |

36. If the condition is met that the COUNTRY\_ID value is 'US', then we will use the Social Security Number Formatted provided out of the box with the product. Select the corresponding radio button and click on the Import button.

| Impo | rt Format                           |           |               |                               |                         |                 |
|------|-------------------------------------|-----------|---------------|-------------------------------|-------------------------|-----------------|
|      | Database db02.ora                   | ele.com   |               | Logged In As                  | system                  | Cancel (Import) |
|      | Owner HR                            |           |               | Column                        | NATIONAL_ID             |                 |
|      | Table EMPLOY                        | ES        |               | Data Type                     | VARCHAR2(100)           |                 |
| Sea  | arch                                |           |               |                               |                         |                 |
|      | Name                                |           |               | ]                             |                         |                 |
|      | Owner                               |           |               | ]                             |                         |                 |
|      | Search                              |           |               | 2                             |                         |                 |
|      |                                     |           |               |                               |                         |                 |
| 0    | National Insurance Number Formatted | Character | EE 57 39 13 D | Generates unique UK Nation    | al Insurance Numbers    | SYSMAN          |
| 0    | Social Insurance Number             | Character | 620334508     | ~1 billion unique Canadian S  | ocial Insurance Numbers | SYSMAN          |
| 0    | Social Insurance Number Formatted   | Character | 362-605-305   | ~1 billion unique Canadian Se | ocial Insurance Numbers | SYSMAN          |
| ۲    | Social Security Number Formatted    | Character | 439-85-8960   | ~718 million unique US Socia  | al Security Numbers     | SYSMAN          |

37. The last step is to set the Default mask if the value of COUNTRY\_ID is not met by any of our conditions, either 'CA', 'UK' or 'US'. Select the radio button for the Default Condition and choose the Preserve Original Data mask and click on the Add button.

| Operation Sector Sec |  |
|---|--|
| (Add a format entry)  |  |
| (Import Format) Format Entry Preserve Original Data + Add   |  |

38. To finish defining a Column Mask, click the **OK** button.

| Define Column Mask   |                   |                    |                            |           |  |  |
|--|-------------------|--------------------|----------------------------|-----------|--|--|
| Owner<br>Column  | HR<br>NATIONAL_ID | Table<br>Data Type | EMPLOYEES<br>VARCHAR2(100) | Cancel OK |  |  |
| By default all records in the table will be masked using the specified format. You can optionally identify more than one subset of records using conditions. Each subset can be masked using a<br>corresponding masking format. The subsets will be masked in the order they are specified. A subset will not be masked again even when it matches a subsequent condition. |                   |                    |                            |           |  |  |

39. The creation of our Condition-based mask is now complete. To finish editing the Masking Definition, click the **OK** button.

| Edit Masking Definition: CONDITIONAL_EMPLOYEE_DATA_MASK |                                  |               |  |  |  |  |  |  |
|---|----------------------------------|---------------|--|--|--|--|--|--|
|   |                                  | (Cancel) (OK) |  |  |  |  |  |  |
| * Name  | CONDITIONAL_EMPLOYEE_DATA_MASK   |               |  |  |  |  |  |  |
| * Database  | db04.oracle.com                  | 8             |  |  |  |  |  |  |
| Description   | Mask Employee Data Conditionally |               |  |  |  |  |  |  |

40. You will be brought back to the Data Masking Definitions page. Select the **CONDITIONAL\_EMPLOYEE\_DATA\_MASK** and click on the **Generate Script** button.



| Vie      | w Edit Generate Script Schedule Job   | Delete Actions  | Clone Database 🗘 Go              |         |                       |                                    |  |  |  |  |
|----------|---|-----------------|----------------------------------|---------|-----------------------|------------------------------------|--|--|--|--|
| Select   | Masking Definition 🛆  | Database        | Description                      | Columns | Status                | Most Recent Job Ended              |  |  |  |  |
| ۲        | CONDITIONAL EMPLOYEE DATA MASK  | db04.oracle.com | Mask Employee Data Conditionally | 7       | Script Not Generated  |                                    |  |  |  |  |
| 0        | HR COMPOUND MASK  | db04.oracle.com | Compound Mask of HR Data         | 5       | Masking Job Succeeded | Jul 27, 2010 10:31:33 PM GMT+00:00 |  |  |  |  |
| $\circ$  | SIMPLE EMPLOYEE DATA MASK   | db04.oracle.com | Mask Employee Data               | e       | Masking Job Succeeded | Jul 27, 2010 9:57:00 PM GMT+00:00  |  |  |  |  |
| <b>兴</b> | Processing: Generating Data Masking Script Database db04.oracle.com Number of Tables 6 Cancel Longer Line & system Columns 12 |                 |                                  |         |                       |                                    |  |  |  |  |
| Ther     | The masking script is being generated. This process may take up to 15 minutes to complete.                                    |                 |                                  |         |                       |                                    |  |  |  |  |
|          |   |                 | $\bigcirc$                       |         |                       |                                    |  |  |  |  |

41. After the data masking script generation has completed successfully, scroll down the page and expand the **Impact Report** section. Choose to save the script to disk for additional review by clicking on the **Save Full Script** button.

| ① Information  |   |                                    |                    |
|--|---|------------------------------------|--------------------|
| Data masking script generation completed successfully.   |   |                                    |                    |
| Script Generation Results: CONDITIONAL_EMPLOYEE_DATA_MASK  |   |                                    |                    |
| Database db04.oracle.com   | Number of Tables                                | 6                                  | Return             |
| Logged in As system  | Columns   | 12                                 |                    |
| Script Options   |   |                                    |                    |
| Use script to clone and mask the database. <u>Clone And Mask</u><br>Schedule the data masking job. The script will be executed by the job to perform the masking operation. <u>Schedule</u>  | Job   |                                    |                    |
| The script summary is a list of the database commands that will be used to mask the selected columns. The full scrip<br>other commands needed during the masking operation. The full script will be executed by the job to perform the mas | t is a PL/SQL script that i<br>sking operation. | ncludes functions, procedures, and | (Save Full Script) |
| View 💿 Script Summary 🔿 Full Script  |   |                                    |                    |
| Target database: db04.oracle.com   |   | <u> </u>                           |                    |
| Script generated at: 27-JUL-2010 23:08   |   | =                                  |                    |
| COMMIT   |   |                                    |                    |
| ALTER SESSION ENABLE PARALLEL DML<br>DROP TABLE 'MGMT_DM_TT_43' PURGE  |   |                                    |                    |

- 42. Before executing the newly created Conditional-based data masking script as we have done previously, open up another browser tab to query the before state of the **HR.EMPLOYEES** table we will be masking.
- 43. Click on the **Schedule Job** button to execute the newly created data mask immediately schedule and run the masking operation. Provide the Host Credentials using the user: Oracle and the provided password. Click on the **Submit** button to execute the job.



| Database db04.oracle.c  | om            | Number of Tables 6                      | (Cancel) (Subm |
|-------------------------|---------------|---|----------------|
| Logged In As system     |               | Columns 12                              | -              |
|                         | * Job Name    | MASKING_JOB_40                          |                |
| ol                      | Description   |   |                |
| * Script                | File Location | /u01/oracle/product/11.2.0/dbhome_1/dbs |                |
| * Scr                   | pt File Name  | masking 40.sql                          |                |
| Host Credentials        |               |   |                |
| * Usernan               | e oracle      |   |                |
| * Passwo                | ъ <b></b>     |   |                |
|                         | Save          | as Preferred Credential                 |                |
| Start                   |               |   |                |
| Immediately             |               |   |                |
|                         |               |   |                |
| Date Jul 27, 2010       |               |   |                |
| Time 11 - 05 - OAM @ PM |               |   |                |
|                         |               |   | (Cancel) (Suba |

44. Once you submit the job, you will be forwarded to a confirmation page that the job was submitted successfully.

| Job Submitted Successfully     Data Masking job has been submitted successfully. <u>View Job Details</u>  | Click on the View J  | ob Details link below to view execution st  | itus.  |  |  |  |  |  |  |  |  |  |
|---|--|---|--|--|--|--|--|--|--|--|--|--|
| Data Masking Definitions  |  |   |  |  |  |  |  |  |  |  |  |  |
| Data masking is the process of making sensitive informati<br>A masking definition defines the columns to be masked an<br>contains a collection of ready-to-use masking formats. | on in test or non-pr<br>nd the format of ma  | oduction databases safe. It disguises sen<br>sked data. You can create a new maskin | sitive information by overwriting it with re<br>g definition or use an existing definition f | alistic looking but false data of a similar type.<br>or a masking operation. The Format Library<br>(Import) Create |  |  |  |  |  |  |  |  |
|   |  |   |  |  |  |  |  |  |  |  |  |  |
| (View) (Edit) (Generate Script) (Schedule Job)  | Delete Actions   | Clone Database 🗘 Go   |  |  |  |  |  |  |  |  |  |  |
| Select Masking Definition 🛆   | Database   | Description   | Columns Status   | Most Recent Job Ended  |  |  |  |  |  |  |  |  |
| CONDITIONAL EMPLOYEE DATA MASK  | db04.oracle.com  | Mask Employee Data Conditionally  | 7 Masking Job Scheduled  |  |  |  |  |  |  |  |  |  |
| O HR COMPOUND MASK  | db04.oracle.com  | Compound Mask of HR Data  | ompound Mask of HR Data 5 Masking Job Succeeded Jul 27, 2010 10:31:33                        |  |  |  |  |  |  |  |  |  |
| SIMPLE EMPLOYEE DATA MASK   | SIMPLE EMPLOYEE DATA MASK     db04-oracle.com     Mask Employee Data     6     Masking Job Succeeded     Jul 27, 2010 9:57:00 PM GMT+00:00 |   |  |  |  |  |  |  |  |  |  |  |

45. Click on the **GO** button to refresh the status of the job.

| Sele | ct Masking Definition 🛆        | Database        | Description                      | Columns Status          | Most Recent Job Ended              |
|------|--------------------------------|-----------------|----------------------------------|-------------------------|------------------------------------|
| ۲    | CONDITIONAL EMPLOYEE DATA MASK | db04.oracle.com | Mask Employee Data Conditionally | 7 Masking Job Succeeded | Jul 27, 2010 11:16:05 PM GMT+00:00 |
| 0    | HR COMPOUND MASK               | db04.oracle.com | Compound Mask of HR Data         | 5 Masking Job Succeeded | Jul 27, 2010 10:31:33 PM GMT+00:00 |
| 0    | SIMPLE EMPLOYEE DATA MASK      | db04.oracle.com | Mask Employee Data               | 6 Masking Job Succeeded | Jul 27, 2010 9:57:00 PM GMT+00:00  |

46. Once the job successfully completes, follow the provided steps again to create a new tab and query the masked data for a before and after comparison. View the data before the compound masking operation for the **HR.EMPLOYEES** table.



|                  | Enterprise Manager 10p   |   |   |   |   |          |                   |      |                       |                 | Ho                                      | Tatorts Team | WW GAR                 | Settp Preter | ences Help Logod  |
|------------------|--|---|---|---|---|----------|-------------------|------|-----------------------|-----------------|---|--------------|------------------------|--------------|-------------------|
| Hosts   Dat      | abases   Middleware   Web  | Applications                              | Services                                  | Systems   Groups   A  | All Targets   |          |                   |      |                       |                 |   |              |                        |              |                   |
| Detabase Instanc | x db02.orade.com > Tables >  |   |   |   | -   |          |                   |      |                       |                 |   |              |                        | Le.          | ouged in As SYSTE |
| View Data        | for Table: HR.EMPLOY   | EES                                       |   |   |   |          |                   |      |                       |                 |   |              |                        |              |                   |
|                  |  |   |   |   |   |          |                   |      |                       |                 |   |              |                        | (F           | Refine Query) OF  |
| Query            | SELECT 19APLONEE_ID; \$<br>1008_ID; \$3UAPY; COM<br>STREET_ADDRESS; POST<br>14R:19APLONEES | FIRST_NAME;<br>MISSION_PCT<br>TAL_CODE; 1 | , 1.AST_NAM<br>, 1MANAGER<br>21TV, "State | e, Ismal, Phone, "<br>UD, Department,"<br>"Province, "Count | NUMBER', "HIRE_DA<br>D', "NATIONAL_ID',<br>IRY_ID' FROM | ale,     |                   |      |                       |                 |   |              |                        |              |                   |
| Result           |  |   |   |   |   |          |                   |      |                       |                 |   |              | © Previous 25          | 25-50 of 107 | Next 25 @         |
|                  | BAPLOYEE ID RRST_NAM   | ELAST_NAM                                 | EBMAIL                                    | PHONE_NUMBER  | HIRE_DATE   | JOB_ID   | BALARY COMMISSION | PCT  | MANAGER_ID DEPARTMENT | IDNATIONAL I    | D STREET_ADDRESS                        | POSTAL_COD   | ECITY                  | STATE_PROVE  | NCECOUNTRY_I      |
|                  | 144 Peter  | Vargas                                    | PV//RG//S                                 | 650.121.2004  | 1998-07-09<br>00:00:00.0                                | ST_CLERK | 2500              |      | 124                   | 50 308-7 1-6324 | 2011 Interiors Blvd                     | 99238        | South San<br>Francisco | Callonia     | US                |
|                  | 146 Karen  | Partners                                  | KPAR TNER                                 | 011.44.1344.467258  | 1997-01-05<br>00:00:00.0                                | SA_MAN   | 13500             | .3   | 100                   | 80 146-439-707  | Magdalen Centre, The Od<br>Science Park | ord 0)19 92B | Oxford                 | Oxford       | цĸ                |
|                  | 148 Gerald   | Cambrault                                 | GCAMBRAL                                  | J011.44.1344.619258   | 1999-10-15<br>00:00:00.0                                | SA_MAN   | 11000             | .3   | 100                   | 80 27 1-348-167 | Magdalen Centre, The Od<br>Science Park | ord ON9 92B  | Oxford                 | Oxford       | цк                |
|                  | 150 Peter  | Tucker                                    | PTUCKER                                   | 011.44.1344.129258  | 1997-01-30<br>00:00:00.0                                | SA_REP   | 10000             | .3   | 145                   | 80 549-8 54-401 | Magdalen Centre, The Od<br>Science Park | ord 009 928  | Oxford                 | Oxford       | цк                |
|                  | 152 Peter  | Hall                                      | PHALL                                     | 011.44.1344.478908  | 1997-08-20<br>00:00:00.0                                | SA_REP   | 9000              | .25  | 145                   | 80 903-398-513  | Magdalen Centre, The Od<br>Science Park | ord 009 928  | Oxford                 | Oxford       | чк                |
|                  | 153 Christopher  | Olsen                                     | COLSEN                                    | 011.44.1344.498718  | 1996-03-30<br>00:00:00.0                                | SA_REP   | 8000              | .2   | 145                   | 80 578-184-005  | Magdalen Centre, The Od<br>Science Park | ord 009 928  | Orford                 | Oxford       | uĸ                |
|                  | 150 Janetie  | King                                      | JAING                                     | 011.44.1345.429258  | 1996-01-30<br>00:00:00.0                                | SA_REP   | 10000             | .35  | 140                   | 80 761-647-787  | Magdalen Centre, The Od<br>Science Park | ord 009 928  | Orford                 | Oxford       | чк                |
|                  | 158 Alan   | MdEwen                                    | ANCEWEN                                   | 0]1.44.1345.829258  | 1995-08-01<br>00:00:00.0                                | SA_REP   | 9000              | .35  | 148                   | 80 942-135-798  | Magdalen Centre, The Od<br>Science Park | ord 009 928  | Oxford                 | Oxford       | uĸ                |
|                  | 160 Louise   | Doran                                     | LDORAN                                    | 011.44.1345.629258  | 1997-12-15<br>00:00:00.0                                | SA_REP   | 7500              | .3   | 140                   | 80 237-752-938  | Magdalen Centre, The Od<br>Science Park | ord 009 928  | Orford                 | Oxford       | uk                |
|                  | 103 Daniele  | Greene                                    | DGREENE                                   | 011.44.1346.229268  | 1999-03-19<br>00:00:00.0                                | SA_REP   | 9500              | . 15 | 147                   | 80 592-624-127  | Magdalen Centre, The Od<br>Science Park | ord 009 928  | Oxford                 | Oxford       | uk                |
|                  | 165 David  | Lee                                       | DLEE                                      | 011.44.1346.529258  | 2000-02-23<br>00:00:00.0                                | SA_REP   | 8800              | -4   | 147                   | 80 311-101-771  | Magdalen Centre, The Od<br>Science Park | ord 009 928  | Oxford                 | Oxford       | uĸ                |
|                  | 100 Sundar   | Ande                                      | SANDE                                     | 011.44.1346.629258  | 2000-03-24<br>00:00:00.0                                | SA_REP   | 6400              | -1   | 147                   | 80 095-933-895  | Magdalen Centre, The Od<br>Science Park | ord 009 928  | Oxford                 | Oxford       | uk                |
|                  | 169 Harrison   | Bloom                                     | HELOOM                                    | 011.44.1343.829258  | 1998-03-23<br>00:00:00.0                                | SA_REP   | 10000             | .2   | 148                   | 80 198-623-106  | Magdalen Centre, The Od<br>Science Park | ord Oile sZB | Oxford                 | Oxford       | цк                |
|                  | 171 William  | Smith                                     | WSMITH                                    | 011.44.1343.629258  | 1999-02-23<br>00:00:00.0                                | SA_REP   | 7400              | . 15 | 148                   | 80 453 679 770  | Magdalen Centre, The Od<br>Science Park | ord Oile eZB | Oxford                 | Oxford       | UK                |
|                  | 173 Sundita  | Kumar                                     | SKLMAR                                    | 011.44.1343.329258  | 2000-04-21<br>00:00:00.0                                | SA_REP   | 6100              | -1   | 148                   | 80 984-931-124  | Magdalen Centre, The Od<br>Science Park | ord 0)19 928 | Oxford                 | Oxford       | цк                |
|                  | 176 Jonathon   | Taylor                                    | JTAYLOR                                   | 011.44.1644.429265  | 1998-03-24  | SA_REP   | 8600              | .2   | 149                   | 80 270-039-908  | Magdalen Centre, The Od                 | ord 009 928  | Oxford                 | Oxford       | UK                |

47. View the data after the compound masking operation for the **HR.EMPLOYEES** table.

| Grid Control      | interprise Ma           | iager 10p                  |              |             |                       |                          |            |        |                |           |              |               | Home Ta                                     | pets Deployme | ans Aens               | Setap Protection | Reports         |
|-------------------|-------------------------|----------------------------|--------------|-------------|-----------------------|--------------------------|------------|--------|----------------|-----------|--------------|---------------|---|---------------|------------------------|------------------|-----------------|
| Hosts   Data      | nbases   Mid            | devare   Web               | Applications | Senices   S | Sjeterns   Groups   A | ll Targets               |            |        |                |           |              |               |   |               |                        |                  |                 |
| Database Instance | e doliž, oracija co     | <u>m</u> > <u>Tables</u> > |              |             |                       |                          |            |        |                |           |              |               |   |               |                        | Logge            | ed in As SYSTEM |
| View Data f       | or Table: H             | R.EMPLOYI                  | EES          |             |                       |                          |            |        |                |           |              |               |   |               |                        | Refe             | e query) (OK)   |
| Query             | SELECT EM               | PLOYEE_ID', 1              | RST_NAME;    | LAST_NAME   | P. 19MAL , 19HONE_N   | UMBER, HIRE_D            | ATE;       |        |                |           |              |               |   |               |                        |                  |                 |
|                   | JOB ID, SI<br>STREET #C | LARY, COMM                 | ISSION PCT,  | 1AANAGER    | ID, DEPARTMENT II     | D, NATIONAL_ID,          |            |        |                |           |              |               |   |               |                        |                  |                 |
|                   | HR: BUPLO               | MES'                       | a_cont, c    |             |                       |                          |            |        |                |           |              |               |   |               |                        |                  |                 |
|                   |                         |                            |              |             |                       |                          |            |        |                |           |              |               |   |               |                        |                  |                 |
| Beaut             |                         |                            |              |             |                       |                          |            |        |                |           |              |               |   |               |                        |                  | <b>.</b>        |
|                   |                         | _                          | _            | _           |                       |                          |            | _      |                | _         | _            |               |   |               | O Previous             | 1-25 of 107      | <u>Net 25</u> @ |
|                   | BAPLOYEE                | D RRST_NAMI                | ELAST_NAMI   | BAAL        | PHONE_NUMBER          | HIRE_DATE                | di_sol     | SALARY | COMMISSION_PCT | MANAGER_I | DEPARTMENT_I | NATIONAL_IC   | STREET_ADDRESS                              | POSTAL_CODI   | ECITY                  | STATE_PROVINCE   | COUNTRY_ID      |
|                   | 17                      | s sunc <b>r</b> a          | Fumar        | SPLIMAR     | 011.44.1343.329208    | 2000-04-21               | 24 HEP     | 8100   | .1             | 148       | 80           | PP 76 50 12 A | Science Park                                | 009.978       | Ustord                 | Uteord           | UK              |
|                   | 17                      | 9 Charles                  | Johnson      | CJOHNSON    | 011.44.1644.429262    | 2000-01-04<br>00:00:00.0 | SA_REP     | 6200   | .1             | 149       | 80           | NK 60 50 67 D | Magdalen Centre, The Oxford<br>Science Park | 009 928       | Oxford                 | Oxford           | ик              |
|                   | 19                      | 5 Alana                    | Walah        | AMALSH      | 650.507.5811          | 1998-04-24<br>00:00:00.0 | SH_CLERK   | 3100   |                | 124       | ×            | 358-64-7106   | 2011 Interiors Blvd                         | 99236         | South San<br>Francisco | Callonia         | us              |
|                   | 20                      | 2 Pat                      | Fay          | PFAY        | 603, 123, 6666        | 1997-08-17<br>00:00:00.0 | MK_REP     | 8000   |                | 201       | 20           | 830950257     | 147 Spacina Ave                             | M 5V 2L7      | Toronto                | Ontario          | CA              |
|                   | 15                      | 9 Lindsey                  | Smith        | LSMITH      | 011.44.1345.729268    | 1997-03-10               | SA_REP     | 8000   | .3             | 140       | 80           | BB 64 70 61 B | Magdalen Centre, The Oxford<br>Science Park | 009 928       | Oxford                 | Oxford           | ик              |
|                   | 12                      | 0 Matthew                  | Weiss        | MWERSS      | 650, 123, 1234        | 1996-07-18               | ST_MAN     | 8000   |                | 100       | ×            | 113-67-0088   | 2011 Interiors Blvd                         | 99238         | South San<br>Francisco | Callonia         | us              |
|                   | 11                      | t Ismael                   | Sciarra      | ISCIARRA    | 515, 124, 4369        | 1997-09-30               | FI_ACCOUNT | 7700   |                | 108       | 100          | 48 1-00-2083  | 2004 Charade Rd                             | 98 199        | Seattle                | Washington       | us              |
|                   | 11                      | 7 Sigal                    | Tobias       | STORIAS     | 515, 127, 4564        | 1997-07-24               | PU_CLERK   | 2800   |                | 114       | 30           | 098-60-008.2  | 2004 Charade Rd                             | 98 199        | Seattle                | Washington       | LIS             |
|                   | 10                      | 3 Alexander                | Hunold       | AHUNOLD     | 590.423.4567          | 1990-01-03               | IT_PROG    | 9000   |                | 102       | ×            | 090-07-6033   | 2014 Jabberwooky Rd                         | 28192         | Southlake              | Texas            | US              |
|                   | 19                      | 3 Britney                  | Everett      | BEVERETT    | 650.501.2876          | 1997-03-03               | SH_CLERK   | 3900   |                | 123       | ×            | 991-55-3052   | 2011 Interiors Blvd                         | 99238         | South San<br>Francisco | Callomia         | US              |
|                   | 20                      | 0 Jennier                  | Whalen       | J/HALEN     | 515,123,4444          | 1987-09-17               | AD_ASST    | 4400   |                | 101       | 10           | 388-01-8005   | 2004 Charade Rd                             | 98 199        | Seattle                | Washington       | US              |
|                   | 17                      | t William                  | Smith        | WSIMITH     | 011.44.1343.629268    | 1999-02-23               | SA_REP     | 7400   | . 15           | 148       | 80           | JJ 43 80 66 C | Magdalen Centre, The Oxford<br>Science Park | 009 9ZB       | Oxford                 | Oxford           | цк              |
|                   | 10                      | 7 Diana                    | Lorentz      | DLORENTZ    | 590.423.5567          | 1999-02-07               | IT_PROG    | 4200   |                | 103       | œ            | 588-43-2021   | 2014 Jabberwooky Rd                         | 25192         | Southlake              | Texas            | LIS             |
|                   | 12                      | 7 James                    | Landry       | LANDRY      | 650.124.1334          | 1999-01-14               | ST_CLERK   | 2400   |                | 120       | ×            | 256-71-2060   | 2011 Interiors Blvd                         | 99238         | South San<br>Francisco | California       | LIS             |
|                   | 13                      | 3 Jason                    | Malin        | JIALLIN     | 650, 127, 1934        | 1996-05-14               | ST_CLERK   | 3300   |                | 122       | ×            | 678-07-8097   | 2011 Interiors Blvd                         | 99238         | South San<br>Francisco | California       | US              |
|                   | 10                      | 8 Nancy                    | Greenberg    | NGREENBE    | 515, 124, 4569        | 1994-08-17               | FI_MGR     | 12000  |                | 101       | 100          | 384-14-4050   | 2004 Charade Rd                             | 98 199        | Seattle                | Washington       | us              |

48. Return to the **Data Masking Definition** screen. We will create a new definition by using the Create Like option. Select the Masking Definition **SIMPLE\_EMPLOYEE\_DATA\_MASK** and choose the **Create Like** option from the Actions and click the **Go** button.

| Data Masking Definitions   |  |                                |  |  |  |  |  |  |  |  |  |  |
|--|--|--------------------------------|--|--|--|--|--|--|--|--|--|--|
| Data masking is the process of making sensitive information in test or non-production databases safe. It disguises sensitive information by overwriting it with realistic looking but take data of a similar type. A masking definition defines the columns to be masked and the format of masked data. You can create a new masking definition or use an existing definition for a masking operation. The Format Library contains a collection of ready-to-use masking formats. |  |                                |  |  |  |  |  |  |  |  |  |  |
| Search Database + Go (Import) Create   |  |                                |  |  |  |  |  |  |  |  |  |  |
| (View) (Edit) (Generate Script) (Schedule Job) (Dele   | ete) Actions Clone Database 🗘  | G0)                            |  |  |  |  |  |  |  |  |  |  |
| Select Masking Definition 🛆 Data   | tabase Clone Database  | Columns Status                 | Most Recent Job Ended                      |  |  |  |  |  |  |  |  |  |
| O CONDITIONAL EMPLOYEE DATA MASK db04  | 04.oracle.com  | onditionally 7 Masking Job Sud | coeeded Jul 27, 2010 11:16:05 PM GMT+00:00 |  |  |  |  |  |  |  |  |  |
| HR COMPOUND MASK db04.oracle.com Save Script Actions a 5 Masking Job Succeeded Jul 27, 2010 10   |  |                                |  |  |  |  |  |  |  |  |  |  |
| SIMPLE EMPLOYEE DATA MASK db0-   | SIMPLE EMPLOYEE DATA MASK     db04.oracle.com     View Script     BMasking Job Succeeded     Jul 27, 2010 9:57:00 PM GMT+00:00 |                                |  |  |  |  |  |  |  |  |  |  |

49. From the **Create Masking Definition** screen, type in the **Name**, **Database** and **Description** field with the provided values below. Continue and click on the **Add** button.



i. Name: USER\_DEFINED\_MASK\_EMAIL Database: db04.oracle.com Description: Mask Employee Data with User Defined Mask - Email

|                         | Masking Definition   | on                                   |  |                             |   |                                      |                                    | Canc                                |                        |
|-------------------------|--|--------------------------------------|--|-----------------------------|---|--------------------------------------|------------------------------------|-------------------------------------|------------------------|
|                         |  | * Name                               | USER_DEFINED_MASK_F  | EMAIL                       |   |                                      |                                    | Course                              |                        |
|                         |  | * Database                           | <i>s</i>   |                             |   |                                      |                                    |                                     |                        |
|                         |  | Description                          |  |                             |   |                                      |                                    |                                     |                        |
| Colur                   | ins  |                                      |  |                             |   | -                                    |                                    |                                     |                        |
| Add col                 | lumns you want to mask                                     | and define masking f                 | format for each column. Fore                                     | eign key columns are autor  | natically accled to maintai   | in referential ir                    | tegrity. Dependent colum           | ns are columns                      |                        |
| hat do                  | not have foreign key co                                    | instraints defined, but              | reference a masked column  | due to application level co | nstraints. You can manua  | lly add depen                        | dent columns to a masked           | column.                             | ( AC                   |
| Rer                     | nove)  | st will remove an ioreq              | gir key and dependent courn                                      | ins.                        |   |                                      |                                    |                                     | 9                      |
| Remove                  |  |                                      |  |                             |   |                                      |                                    |                                     |                        |
| Select                  | All Select None  |                                      |  |                             |   |                                      |                                    |                                     |                        |
| <u>Select</u>           | All Select None  |                                      |  |                             |   |                                      |                                    | Dependent                           | Columr                 |
| <u>Select</u><br>Select | All Select None<br>Owner Table                             | \$                                   | Column   | Column Group                | Data Type   | Format                               | Foreign Key Columns                | Dependent<br>Count                  | Columr<br>Add          |
| Select                  | All Select None<br>Owner Tabk<br>HR EMPI                   | e<br>LOYEES                          | Column<br>EMPLOYEE_ID  | Column Group                | Data Type<br>NUMBER   | Format                               | Foreign Key Columns<br>5           | Dependent<br>Count                  | Colum<br>Add<br>순      |
| Select                  | All Select None Owner Table HR EMPI HR EMPI                | e<br>LOYEES<br>LOYEES                | Column<br>EMPLOYEE_ID<br>FIRST_NAME                              | Column Group                | Data Type<br>NUMBER<br>VARCHAR2(20)                                 | Format                               | Foreign Key Columns<br>5<br>0      | Dependent<br>Count<br>1             | Columi<br>Add<br>순     |
| Select                  | All Select None Owner Table HR EMPI HR EMPI HR EMPI        | LOYEES<br>LOYEES                     | Column<br>EMPLOYEE_ID<br>FIRST_NAME<br>LAST_NAME                 | Column Group                | Data Type<br>NUMBER<br>VARCHAR2(20)<br>VARCHAR2(25)                 | Format                               | Foreign Key Columns<br>5<br>0<br>0 | Dependent (<br>Count<br>1<br>0<br>0 | Colum<br>Add<br>ት<br>ት |
|                         | Al Select None Owner Table HR EMPI HR EMPI HR EMPI HR EMPI | LOYEES<br>LOYEES<br>LOYEES<br>LOYEES | Column<br>EMPLOYEE_ID<br>FIRST_NAME<br>LAST_NAME<br>PHONE_NUMBER | Column Group                | Data Type<br>NUMBER<br>VARCHAR2(20)<br>VARCHAR2(25)<br>VARCHAR2(20) | Format<br>F)<br>F)<br>F)<br>F)<br>F) | Forsign Key Columns<br>5<br>0<br>0 | Dependent (<br>Count<br>1<br>0<br>0 | colum<br>Add<br>ት<br>ት |

- 50. For this Masking Definition, we will add the column EMAIL. We are going to search in the EMPLOYEES table in the HR Schema for the EMAIL Column name. Type in the following values and click on the **Search** button. Select the **EMAIL** column and click on the **Add** button.
  - i. Schema: HR Table Name: EMPLOYEE Column Name: EMAIL

| aa Columns          | Database db0           | 4.oracle.com                 |                              | ogged in As system                       | Cancel Add Define Format A                  | And Add |
|---------------------|------------------------|------------------------------|------------------------------|--|---|---------|
| id one or more colu | mns for masking. Forei | gn key columns will be added | automatically. You can defir | e masking format at once for all selecte | ed columns if they have the same data type. |         |
| Search              |                        |                              |                              |  |   |         |
| Schema              | HR                     |                              | 🛛 🖋 🛛 Column Na              | ne EMAIL                                 |   |         |
| Table Name          | EMPLOYEES              |                              | Column Comm                  | ent                                      |   |         |
|                     | Search                 |                              | _                            | Enter a string in column comments.       | ,   |         |
| Mack celecter       | i columne se s groun   |                              |                              |  |   |         |
| Colort All L Color  | t None                 |                              |                              |  |   |         |
| Select Owner        | Table Name             | Column Name                  | Data Type                    | Comment                                  |   |         |
| HR HR               | EMPLOYEES              | EMAIL                        | VARCHAR2(100)                | MASK candidate: HR Privacy Policy        |   |         |
|                     |                        |                              |                              |  |   |         |

51. Continue by clicking on the Armaticon on the EMAIL column.

|   |   | HR              | EMPLOYEES                     | EMAIL                 | VARCHAR2(100) | 1       | 0 | 0 | ቀ |
|---|---|-----------------|-------------------------------|-----------------------|---------------|---------|---|---|---|
| L | ß | Columns that ha | ve this icon do not have a ma | sking format defined. |               | · · · · |   |   |   |

52. In the Define Column Mask screen in the section of Format Entry, select User Defined Function from the drop-down list box and click on the Add button. After the Default Condition section expands, specify the Package Name: HR and Function Name: EMAIL\_MASK. Click on the OK button.



| Define Column Mask  |                           |                         |                          |                           |                                 |             |
|---|---------------------------|-------------------------|--------------------------|---------------------------|---------------------------------|-------------|
| Owner HR  |                           | Table                   | EMPLOYEES                |                           | Car                             | ncel) OK)   |
| Column EMAIL  |                           | Data Type               | VARCHAR2(100)            |                           |                                 |             |
| By default all records in the table will be masked using the specified fo | rmat. You can optional    | ly identify more than c | ne subset of records usi | ing conditions. Each subs | et can be masked using a corres | ponding     |
| masking format. The subsets will be masked in the order they are spe      | cified. A subset will not | be masked again eve     | n when it matches a sub  | sequent condition.        |                                 |             |
|   |                           |                         |                          |                           | Add                             | d Condition |
| (Import Format) Format Entry User Defined Function                        | Add                       |                         |                          |                           |                                 |             |
|   |                           |                         |                          |                           |                                 |             |
| Expand All   Collapse All   |                           | Format                  | Entry Dronartiae         |                           |                                 |             |
| Select Condition  | Property                  | Value                   | Property                 | Value                     | Sample                          | Remove      |
| ▼ Conditions  |                           |                         |                          |                           |                                 |             |
| Operation   |                           |                         |                          |                           | <b>F1</b>                       |             |
|   | <b>E</b>                  | [                       | <i>a</i>                 |                           |                                 |             |
| User Defined Function   | Package Name              | HR                      | Function Name            | EMAIL_MASK                |                                 | 2           |
|   |                           |                         |                          |                           | Car                             |             |

53. At this step, you could continue to add to your Masking Definition. To finish creating this Masking Definition, click the **OK** button.

| Edit Masking Definition: USER_DEFINED_MASK_EMAIL |   |            |  |  |  |  |  |  |  |
|--|---|------------|--|--|--|--|--|--|--|
|  |   | Cancel) OK |  |  |  |  |  |  |  |
| * Name   | USER_DEFINED_MASK_EMAIL                           |            |  |  |  |  |  |  |  |
| * Database                                       | db04.oracle.com                                   | 3          |  |  |  |  |  |  |  |
| Description                                      | Mask Employee Data with User Defined Mask - Email |            |  |  |  |  |  |  |  |
|  |   |            |  |  |  |  |  |  |  |

54. You will be brought back to the Data Masking Definitions page. Select the USER\_DEFINED\_MASK\_EMAIL and click on the Generate Script button.

| Vie        | w) (Edit) Generate Script) Schedule Jo   | Delete Act      | ions Clone Database 🖨 Go                          |         |                       |                                    |  |  |  |  |
|------------|--|-----------------|---|---------|-----------------------|------------------------------------|--|--|--|--|
| Select     | Masking Definition 🛆   | Database        | Description                                       | Columns | Status                | Most Recent Job Ended              |  |  |  |  |
| $^{\circ}$ | CONDITIONAL EMPLOYEE DATA MASK   | db04.oracle.com | Mask Employee Data Conditionally                  | Z       | Masking Job Succeeded | Jul 27, 2010 11:16:05 PM GMT+00:00 |  |  |  |  |
| 0          | HR COMPOUND MASK   | db04.oracle.com | Compound Mask of HR Data                          | 5       | Masking Job Succeeded | Jul 27, 2010 10:31:33 PM GMT+00:00 |  |  |  |  |
| 0          | SIMPLE EMPLOYEE DATA MASK  | db04.oracle.com | Mask Employee Data                                | 6       | Masking Job Succeeded | Jul 27, 2010 9:57:00 PM GMT+00:00  |  |  |  |  |
| ٢          | USER DEFINED MASK EMAIL  | db04.oracle.com | Mask Employee Data with User Defined Mask - Email | Z       | Script Not Generated  |                                    |  |  |  |  |
| The        | OpenLine of the system     Number of Tables     6     Cancel       The masking script is being generated. This process may take up to 15 minutes to complete.     Columns     12 |                 |   |         |                       |                                    |  |  |  |  |
|            | $\bigcirc$   |                 |   |         |                       |                                    |  |  |  |  |
|            |  |                 | $\bigcirc$  |         |                       |                                    |  |  |  |  |

55. After the data masking script generation has completed successfully, scroll down the page and expand the **Impact Report** section. Choose to save the script to disk for additional review by clicking on the **Save Full Script** button.

| ① Information   |  |                    |
|---|--|--------------------|
| Data masking script generation completed successfully.  |  |                    |
| cript Generation Results: USER_DEFINED_MASK_EMAIL   |  |                    |
| Database db04.oracle.com  | Number of Tables 6   | Return             |
| Logged In As system   | Columns 12   |                    |
| Script Options  |  |                    |
| Use script to clone and mask the database. Clone And Mask   |  |                    |
| Schedule the data masking job. The script will be executed by the job to perform the masking oper | ration. Schedule Job   |                    |
| ▼Script   |  |                    |
| The script summary is a list of the database commands that will be used to mask the selected colu | umns. The full script is a PL/SQL script that includes functions, procedures, an | d Save Full Script |
| other commands needed during the masking operation. The full script will be executed by the job   | to perform the masking operation.  |                    |
| View 💿 Script Summary 🔿 Full Script   |  |                    |
| Target database: db04.oracle.com  |  |                    |
| Script generated at: 28-JUL-2010 00:25  |  |                    |
| COMMIT  |  |                    |
| ALTER SESSION ENABLE PARALLEL DML   |  |                    |
| DROP TABLE 'MGMT_DM_TT_63' PURGE  |  |                    |
| declare   |  |                    |
| adj number:=0;  |  |                    |
| num number:=0;  |  |                    |

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- 56. Before executing the newly created compound data masking script as we have done previously, open up another browser tab to query the before state of the HR.EMPLOYEES table we will be masking.
- 57. Click on the **Schedule Job** button to execute the newly created data mask immediately schedule and run the masking operation. Provide the Host Credentials using the user: Oracle and the provided password. Click on the **Submit** button to execute the job.

| Schedule Data Masking Job: USI              | ER_DEFINED_MASK_       | EMAIL                                   |      |                     |
|---|------------------------|---|------|---------------------|
| Database                                    | db04.oracle.com        | Number of Tables                        |      | 6 (Cancel) (Submit) |
| Logged in As                                | system                 | Coli                                    | ımns | 12                  |
|   | * Job Name             | MASKING_JOB_60                          |      |                     |
|   | Job Description        |   |      |                     |
|   | * Script File Location | /u01/oracle/product/11.2.0/dbhome_1/dbs | ] 🤞  | 9                   |
|   | * Script File Name     | masking60.sql                           |      |                     |
| Host Credentials                            |                        |   |      |                     |
|   | * Username oracle      |   |      |                     |
|   | * Password             |   |      |                     |
|   | Save Save              | as Preferred Credential                 |      |                     |
| Start                                       |                        |   |      |                     |
| Immediately                                 |                        |   |      |                     |
| ◯ Later                                     |                        |   |      |                     |
| Date Jul 28, 2010                           | <b></b>                |   |      |                     |
| (example:Jul 28,2010)<br>Time 12 ≜ 25 ≜ ⊛ A | м О рм                 |   |      |                     |

58. Once you submit the job, you will be forwarded to a confirmation page that the job was submitted successfully.

| Job Submitted Successfully     Data Masking job has been submitted successfully. Click on the View Job Details link below to view execution status. <u>View Job Details</u>   |   |  |             |   |  |  |  |  |  |  |
|---|---|--|-------------|---|--|--|--|--|--|--|
| Data Masking Definitions  |   |  |             |   |  |  |  |  |  |  |
| Data masking is the process of making sensitive infor<br>A masking definition defines the columns to be mask<br>contains a collection of ready-to-use masking formats<br>Search Database<br>(View) Edit Generate Script Schedule jo | mation in test or n<br>ad and the format<br>s.<br>m*<br><u>b) (Delete) Ac</u> | on-production databases safe. It disguises sensitive init<br>of masked data. You can create a new masking definition<br>Co<br>tions Clone Database  Co | ormation by | overwriting it with realisti<br>n existing definition for a r | boking but fabe data of a similar type.<br>nasking operation. The Format Library |  |  |  |  |  |
| Select Masking Definition   | Database  | Description  | Columns     | Status  | Most Recent Job Ended  |  |  |  |  |  |
| CONDITIONAL EMPLOYEE DATA MASK  | db04.oracle.com   | Mask Employee Data Conditionally   | 7           | Masking Job Succeeded   | Jul 27, 2010 11:16:05 PM GMT+00:00   |  |  |  |  |  |
| O HR COMPOUND MASK  | db04.oracle.com   | Compound Mask of HR Data   | 5           | Masking Job Succeeded   | Jul 27, 2010 10:31:33 PM GMT+00:00   |  |  |  |  |  |
| O SIMPLE EMPLOYEE DATA MASK   | db04.oracle.com   | Mask Employee Data   | 6           | Masking Job Succeeded   | Jul 27, 2010 9:57:00 PM GMT+00:00  |  |  |  |  |  |
| O USER DEFINED MASK EMAIL   | db04.oracle.com   | Mask Employee Data with User Defined Mask - Email  | Z           | Masking Job Scheduled   |  |  |  |  |  |  |

59. Click on the **GO** button to refresh the status of the job.

| Vie   | View)(Edit) (Generate Script) (Schedule Job) (Delete) Actions Chone Database |                 |   |         |                       |                                    |  |  |  |  |  |
|-------|--|-----------------|---|---------|-----------------------|------------------------------------|--|--|--|--|--|
| Selec | Masking Definition 🛆   | Database        | Description                                       | Columns | Status                | Most Recent Job Ended              |  |  |  |  |  |
| ۲     | CONDITIONAL EMPLOYEE DATA MASK   | db04.oracle.com | Mask Employee Data Conditionally                  | 7       | Masking Job Succeeded | Jul 27, 2010 11:16:05 PM GMT+00:00 |  |  |  |  |  |
| 0     | HR COMPOUND MASK   | db04.oracle.com | Compound Mask of HR Data                          | 5       | Masking Job Succeeded | Jul 27, 2010 10:31:33 PM GMT+00:00 |  |  |  |  |  |
| 0     | SIMPLE EMPLOYEE DATA MASK  | db04.oracle.com | Mask Employee Data                                | Ē       | Masking Job Succeeded | Jul 27, 2010 9:57:00 PM GMT+00:00  |  |  |  |  |  |
| 0     | USER DEFINED MASK EMAIL  | db04.oracle.com | Mask Employee Data with User Defined Mask - Email | 2       | Masking Job Succeeded | Jul 28, 2010 12:31:21 AM GMT+00:00 |  |  |  |  |  |

60. Once the job successfully completes, follow the provided steps again to create a new tab and query the masked data for a before and after comparison. View the data before the user-defined masking operation for the **HR.EMPLOYEES** table on the **EMAIL** column.



| ORA<br>Grid Co | LC Enterprise   | e Manager 10g         | 9               |               |                     |            |              | Home   | Targets Deploy  | nents Alerts | Setup Prefer  | ences <u>Help L</u><br>lobs Repo | rts     |
|----------------|---|-----------------------|-----------------|---------------|---------------------|------------|--------------|--------|-----------------|--------------|---------------|----------------------------------|---------|
| Hosts          | L Databases II  | Middleware I          | Web Applicati   | ons   Service | es I Sustems I Gr   |            | amete        | TIGHTE | Parifees Papier | Here's       | compliance )  | nepo                             |         |
|                | Databases   | windueware            | web Application |               | pa   Gyatenna   Cin |            | iigeta       |        |                 |              |               |                                  |         |
| Database       | Instance: db02.or   | acle.com > <u>Tab</u> | iles >          |               |                     |            |              |        |                 |              | Lo            | gged in As S'                    | YSTEM   |
| View           | )ata for Tab  | le: HR.EM             | PLOYEES         |               |                     |            |              |        |                 |              |               |                                  |         |
|                |   |                       |                 |               |                     |            |              |        |                 |              | R             | efine Query)                     | OK      |
| Query          | SELECT 'EMPL  | OYEE ID', 'F          | IRST NAME'.     | 'LAST NAM'    | E", "EMAIL", "PHOP  | VE NUMBER  |              | 1      |                 |              |               |                                  |         |
|                | 'HIRE_DATE', 'JOB_ID', 'SALARY', 'COMMISSION_PCT', 'MANAGER_ID', 'DEPARTMENT_ID |                       |                 |               |                     |            |              |        |                 |              |               |                                  |         |
|                | 'NATIONAL_ID', 'STREET_ADDRESS', 'POSTAL_CODE', 'CITY', 'STATE_PROVINCE',       |                       |                 |               |                     |            |              |        |                 |              |               |                                  |         |
|                | COUNTRY_ID  | FROM "HR"."           | 'EMPLOYEES'     |               |                     |            |              |        |                 |              |               |                                  |         |
|                |   |                       |                 |               |                     |            |              |        |                 |              |               |                                  |         |
|                |   |                       |                 |               |                     |            |              |        |                 |              |               |                                  |         |
| Result         |   |                       |                 |               |                     |            |              |        |                 |              |               |                                  |         |
|                | EMPLOYEE_ID   | FIRST_NAME            | LAST_NAME       | EMAIL         | PHONE_NUMBER        | HIRE_DATE  | JOB_ID       | SALARY | COMMISSION_PCT  | MANAGER_ID   | DEPARTMENT_IC | NATIONAL                         | _ID STI |
|                | 6700154081  | Graham                | Belushi         | MSULLIVA      | +1 313 123 4230     | 1999-06-21 | SH_CLERK     | 10000  |                 | 7299185015   | 50            | 766-42-697                       | 5 310   |
|                |   |                       |                 |               |                     | 00:00:00.0 |              |        |                 |              |               |                                  | Pky     |
|                | 6674611078  | Clara                 | Finney          | WSMITH        | +1 319 123 4301     | 1999-02-23 | SA_REP       | 24000  | .18             | 5 7283523029 | 80            | ) 142-937-18                     | 4 221   |
|                |   |                       |                 |               |                     | 00:00:00.0 |              |        |                 |              |               |                                  | 300     |
|                | 4133067045  | Cary                  | Bates           | GGEONI        | +1 410 123 4813     | 2000-02-03 | SH_CLERK     | 2100   |                 | 7299185015   | 50            | 991-91-840                       | 4 200   |
|                |   |                       |                 |               |                     | 00:00:00.0 |              |        |                 |              |               |                                  |         |
|                | 6453363033  | Keir                  | Baldwin         | ABULL         | +1 412 123 4684     | 1997-02-20 | SH_CLERK     | 6000   |                 | 9750595016   | 50            | 932-32-518                       | 7 Po    |
|                |   | _                     | -               |               |                     | 00:00:00.0 |              |        |                 |              |               |                                  |         |
|                | 4268540074  | Rosanne               | Cage            | KPARTNER      | +1 608 123 4374     | 1997-01-05 | SA_MAN       | 2200   |                 | 1227795000   | 80            | 106-503-39                       | 5 122   |
|                |   |                       |                 | 704 10        | 1 010 100 1711      | 10000000   | 0T. 01 5 514 |        |                 | 2020100021   |               |                                  |         |
|                | /918//0028  | LOUIS                 | Ashby           | TRAJS         | +1 610 123 4/14     | 1995-10-17 | ST_CLERK     | 8000   |                 | 7278130071   | 50            | 858-29-141                       | 2 835   |

61. View the data after the compound masking operation for the **HR.EMPLOYEES** table. Notice the new masked values for **EMAIL** column.

| ORAC<br>Grid Co | CLE Enterpris  | e Manager 10 <sub>1</sub> | g             |  | Home           | Targets                  | Deployments | Alerts | Setup Preferen<br>Compliance Jot | oes <u>Help Logout</u><br>os Reports |
|-----------------|--|---------------------------|---------------|--|----------------|--------------------------|-------------|--------|----------------------------------|--------------------------------------|
| Hosts           | Databases  | Middleware                | Web Applicati | ons   Services   Systems   Groups   All Targ | ets            |                          |             |        |                                  |                                      |
| Database        | Instance: db02.or  | acle.com > <u>Tab</u>     | les >         |  |                |                          |             |        | Logg                             | jed in As SYSTEM                     |
| View I          | Data for Tab   | le: HR.EM                 | PLOYEES       |  |                |                          |             |        |                                  |                                      |
|                 |  |                           |               |  |                |                          |             |        | Ref                              | ine Query) OK                        |
| Query           | Query       SELECT 'EMPLOYEE_ID', 'FIRST_NAME', 'LAST_NAME', 'EMAIL', 'PHONE_NUMBER',         'HIRE_DATE', 'JOB_ID', 'SALARY', 'COMMISSION_PCT', 'MANAGER_ID', 'DEPARTMENT_ID',         'NATIONAL_ID', 'STREET_ADDRESS', 'POSTAL_CODE', 'CITY', 'STATE_PROVINCE',         'COUNTRY_ID' FROM 'HR'.'EMPLOYEES' |                           |               |  |                |                          |             |        |                                  |                                      |
| Result          |  |                           |               |  |                |                          |             |        |                                  |                                      |
|                 | EMPLOYEE_ID  | FIRST_NAME                | LAST_NAME     | EMAIL  | PHONE_NUMBER   | HIRE_DATE                | JOB_ID      | SALARY | COMMISSION_PCT                   | MANAGER_ID DE                        |
|                 | 5430056067   | Carol                     | Belushi       | Ajay.9748893048.Chandar@mailinator.com       | (510) 555-4001 | 1994-08-17<br>00:00:00.0 | FI_MGR      | 8000   |                                  | 5739698036                           |
|                 | 1503608097   | Sissy                     | Altman        | Billy.4786488071.Bogart@mailinator.com       | (925) 555-0043 | 1994-06-07<br>00:00:00.0 | AC_MGR      | 8000   |                                  | 5739698036                           |
|                 | 8640344069   | Rick                      | Belushi       | Rosanne.1244434091.Alexander@mailinator.com  | (510) 555-6025 | 1996-06-14<br>00:00:00.0 | ST_CLERK    | 3800   |                                  | 6628932064                           |
|                 | 8352284046   | Carol                     | Andrews       | Ajay.6046501022.Bradford@mailinator.com      | (925) 555-6019 | 1997-03-03<br>00:00:00.0 | SH_CLERK    | 7900   |                                  | 5806597068                           |
|                 | 5806597068   | Alexander                 | Bel Geddes    | Rodolfo.1100963076.Cage@mailinator.com       | (925) 555-6019 | 1997-10-10<br>00:00:00.0 | ST_MAN      | 9000   |                                  | 2246631072                           |
|                 | 9133617007   | Bryan                     | Ashby         | Kristin.4797446075.Andrews@mailinator.com    | (925) 555-5023 | 1996-07-18<br>00:00:00.0 | ST_MAN      | 7800   |                                  | 2246631072                           |



This concludes the Oracle Enterprise Manager Data Masking Hands-on Lab. If you have time, please continue the following OPTIONAL lab for extra credit <sup>(2)</sup> !



# **Deterministic masking (OPTIONAL – Extra Credit)**

1. Navigate to the desktop and click on the icon, 'Access\_Supplemental\_Content.sh'. Click on the Run in Terminal button when provided the option.

|                           | Infrastructure Quick<br>Links                        |                         |                  |
|---------------------------|--|-------------------------|------------------|
| Trash                     | Access_<br>Supplemental_                             |                         |                  |
| Labs                      | Content.sh   |                         |                  |
| Workshop Survey<br>Online |  |                         |                  |
|                           |  |                         | ×                |
| Po y<br>"Acc<br>or d      | ou want to run<br>cess_Supplemen<br>isplay its conte | htal_Content.sh<br>nts? | י",              |
| "Acce                     | ss_Supplemental_Co                                   | ntent.sh" is an execu   | table text file. |
| Run in Termin             | al <u>D</u> isplay                                   | X Cancel                | <u>R</u> un      |

2. After the **Supplemental** folder is copied to the desktop, drill down to the folder **Supplemental->11g\_DB\_Security** → EM\_-\_Data\_Masking → DM – Lab Exercise 06.







3. In the DM – Lab Exercise 06 folder, click on the icon, 'Step 1-Set\_Environment\_for\_Deterministic\_Masking.sh'. This will set up the two database users, HR01 and HR02 that will be used in this exercise. Hit the "return" to close the window once the script is done.



4. Click on **'Step 2 – Enterprise Manager Grid Control – Deterministic Masking'** to open the browser to login into Grid Control.



5. Login to Grid Control at the URL http://dbsecurity.oracle.com:4889/em using the User Name: sysman and the Password: oracle1. Click on the Login button.



6. After logging on to Enterprise Manager – Grid Control, click on the Targets tab.

| Grid Control 11g | Home    | argets   | Deployments Alerts Compliance Jobs Reports My Oracle Support |
|------------------|---------|----------|--|
| View All Targets | \$ Targ | et Searc | Page Refreshed Jul 28, 2010 8:50:49 PM UTC                   |
| Overview         | Searc   | h All    | ¢ (60)   |

7. Click on Databases.



| Grid Control 11g                              |                        | Home         | Targets Deplo         | yments Alerts        | Compliance Jobs | Setup Pre<br>Reports My | erences Help Logout<br>Oracle Support |
|---|------------------------|--------------|-----------------------|----------------------|-----------------|-------------------------|---------------------------------------|
| Hosts Databases Middleware   Web Applications | :   Services   Systems | Groups   Vir | tual Servers   All Ta | argets               |                 |                         |                                       |
| Hosts<br>Search Co d                          | idvanced<br>Search     |              |                       |                      | Page Refreshed  | Jul 28, 2010 8:51:      | 39 PM UTC 🖹                           |
| (Remove) Configure)   (Add)                   |                        |              |                       |                      |                 |                         |                                       |
| Select Name 🛆                                 | Status                 | Alerts       | Policy Violations     | Compliance Score (%) | CPU Util %      | Mem Util %              | Total IO/sec                          |
| dbsecurity.oracle.com                         | Û                      | Q 2          | <u>11</u> 0 0         | 82                   | <u>13.26</u>    | <u>67.96</u>            | 20.62                                 |

8. Click on the database link db04.oracle.com.

| Data<br>View | Databases<br>/ew ○ Oracle Load Map <sup>©</sup> Search List Page Refreshed Jul 28, 2010 8:52:58 PM UTC ℝ |        |        |                             |                      |            |               |               |                 |                  |  |  |
|--------------|--|--------|--------|-----------------------------|----------------------|------------|---------------|---------------|-----------------|------------------|--|--|
| Target       | Targets Not Configured 1   |        |        |                             |                      |            |               |               |                 |                  |  |  |
| Search       | Search Search  |        |        |                             |                      |            |               |               |                 |                  |  |  |
| Re           | (Remove) Configure   (Add)   |        |        |                             |                      |            |               |               |                 |                  |  |  |
| Selec        | tName 🛆  | Status | Alerts | Policy Violations           | Compliance Score (%) | Version    | Sessions: CPU | Sessions: I/O | Sessions: Other | Instance CPU (%) |  |  |
| ۲            | av.oracle.com  | 4      |        | <u>1</u> <u>25</u> <u>3</u> | 99                   | 10.2.0.3.0 |               |               |                 |                  |  |  |
| 0            | db01.oracle.com  | 4      |        | <u>5 28</u> 6               | 98                   | 11.1.0.7.0 |               |               |                 |                  |  |  |
| 0            | db02.oracle.com  | 4      |        | <u>5 26 2</u>               | 98                   | 11.1.0.7.0 |               |               |                 |                  |  |  |
| 0            | db03.oracle.com  | 4      |        | 1 26 3                      | 99                   | 10.2.0.4.0 |               |               |                 |                  |  |  |
| 0            | db04.oracle.com  | ÷      | 30     | 000                         | -                    | 11.2.0.1.0 | -             | - 🧹           | - 🧹             | -                |  |  |
| 0            | db06.oracle.com  | 4      |        | 000                         | -                    | 11.2.0.1.0 |               |               |                 |                  |  |  |
| 0            | emrep.oracle.com   | û      | 1 5    | <u>15 69 5</u>              | 92                   | 10.2.0.4.0 | <u>.01</u>    | <u>.01</u> 🛷  | 0 🛷             | <u>.44</u>       |  |  |

9. Right click on the link, 'Schema' and choose the option, 'Open Link in New Tab'.

| Database Instance: db04.oracle.com   |  |                                  |  |
|--------------------------------------|--|----------------------------------|--|
|                                      |  |                                  |  |
| Home Performance Availability Server | Schema Data Movement Software            | and Support                      |  |
|                                      | 👘 🚰 Open Link in New <u>W</u> indo       | W of the 28, 2010 0.02-55 PM CMT | View Data Automatically (60 and)         |
|                                      | 🙍 Open Link in New <u>T</u> ab           | ad Jul 28, 2010 5:02:30 Pm Gm1   | Refresh View Data Automatically (60 Sec) |
| General                              | Host CPI and and a second second         | Sessions                         | SQL Bestionse Time                       |
| Shutdown Black Out                   | Bookmark This Link                       |                                  |  |
| 11                                   | 1.0 Grave Link As                        |                                  | 1.0                                      |
| Status Up                            | Sen <u>d</u> Link                        |                                  |  |
| Up Since Jul 28, 2010 5:52:53 PM UTC | 0.5 Copy Link Location                   |                                  | 0.5                                      |
| Instance Name db04                   | _  |                                  |  |
| Version 11.2.0.1.0                   | 0.0 – 🥜 Properties                       |                                  | 0.0                                      |
| Host dbsecurity.oracle.com           | Loading                                  | Loading                          | Loading                                  |
| Listener LISTENER1 dbsecurity.oracle | Load 0.00 Paging 0.00                    | CPU Cores 2                      | SQL Besponse Time (%) Unavailable        |
| View All Properties                  | Louid <u>once</u> frighting <u>state</u> |                                  | Edit Reference Collection                |

10. In the newly opened tab, we will query the HR01 table. Click on the Tables link.

| Database I  | Database Instance: db04.oracle.com         |  |  |             |               |                      |                        |  |  |  |  |  |  |
|-------------|--|--|--|-------------|---------------|----------------------|------------------------|--|--|--|--|--|--|
| Home        | Home Performance Availability Server Schem |  |  | Schema      | Data Movement | Software and Support |                        |  |  |  |  |  |  |
| Database    | Database Objects                           |  |  |             |               |                      | Materialized Views     |  |  |  |  |  |  |
| Tables      | Tables                                     |  |  |             | ickages       |                      | Materialized Views     |  |  |  |  |  |  |
| Indexes     |  |  |  | Pa          | ickage Bodies |                      | Materialized View Logs |  |  |  |  |  |  |
| Views       |  |  |  | Pn          | ocedures      |                      | Refresh Groups         |  |  |  |  |  |  |
| Synonyms    |  |  |  | Fu          | Inctions      |                      | Dimensions             |  |  |  |  |  |  |
| Sequences   |  |  |  | Tr          | iggers        |                      |                        |  |  |  |  |  |  |
| Database L  | inks                                       |  |  | <u>Ja</u> r | va Classes    |                      |                        |  |  |  |  |  |  |
| Directory C | Directory Objects                          |  |  |             | Java Sources  |                      |                        |  |  |  |  |  |  |
| Reorganize  | Objects                                    |  |  |             |               |                      |                        |  |  |  |  |  |  |

If prompted, login to the database using the Username: system and Password: oracle1.
 Click on the Login button when finished.
 TIP: select the option to "Save as Preferred Credential".



| Database Login               |
|------------------------------|
| - Username system            |
| Password                     |
| Database db04.oracle.com     |
| Connect As Normal            |
| Save as Preferred Credential |
| (Cancel) (Login)             |

12. We will be querying the HR01 schema and the EMPLOYEES table. Click on the Go button.

| Tables           |  |                   |
|------------------|--|-------------------|
|                  |  | Object Type Table |
| Search           |  |                   |
| Select an object | t type and optionally enter a schema name and an object name to filter the data that is displayed in your results set. |                   |
| Schema           | HB01 🖉   |                   |
| Object Name      | EMPLOYEES  |                   |
|                  | 60)  |                   |

13. Select the Action to View Data and click on the Go button.

| Selection Mode Single ¢                             |            |            |             |                    |  |  |  |  |  |  |  |
|---|------------|------------|-------------|--------------------|--|--|--|--|--|--|--|
| (Edit) View) Delete With Options) Actions View Data |            |            |             |                    |  |  |  |  |  |  |  |
| Select Schema 🛆                                     | Table Name | Tablespace | Partitioned | Rows Last Analyzed |  |  |  |  |  |  |  |
| HR01  | EMPLOYEES  | EXAMPLE    | NO          |                    |  |  |  |  |  |  |  |
|   |            |            |             | (Recycle Bin)      |  |  |  |  |  |  |  |

14. Click on the EMPLOYEE\_ID column to sort the data. This is the pre-masked data for HR01.EMPLOYEES. We will use the same steps above to view this table after the masking process.

| View   | Data for Table   | : HR01.EM  | PLOYEES   |            |  |                                   |         |        |                |            | (Refine Query) (OK)       |
|--------|--|--|---|------------|--|-----------------------------------|---------|--------|----------------|------------|---------------------------|
| Query  | SELECT 'EMPLO'<br>'HIRE_DATE', '.X<br>'NATIONAL_ID', '<br>'COUNTRY_ID' F | YEE_ID', 'FIRS<br>DB_ID', 'SALAF<br>STREET_ADD<br>ROM 'HR01'.' | ST_NAME', 'LA<br>RY', 'COMMIS<br>RESS', 'POST<br>EMPLOYEES' | SION_PCT', | 'EMAIL', 'PHONE_<br>'MANAGER_ID', 'D<br>CITY', 'STATE_PR | NUMBER*,<br>EPARTMENT<br>OVINCE*, | "_ID",  |        |                |            |                           |
| Result |  | _  |   |            |  |                                   |         |        |                |            |                           |
|        |  | FIRST_NAME   | LAST_NAME   | EMAIL      | PHONE_NUMBER   | HIRE_DATE                         | JOB_ID  | SALARY | COMMISSION_PCT | MANAGER_ID | DEPARTMENT_ID NATIONAL_ID |
|        | 100  | Steven   | King  | SKING      | 515.123.4567   | 1987-06-17<br>00:00:00.0          | AD_PRES | 24000  |                |            | 90 494-17-9546            |
|        | 101  | Neena  | Kochhar   | NKOCHHAR   | 515.123.4568   | 1989-09-21<br>00:00:00.0          | AD_VP   | 17000  |                | 100        | 90 625-15-1353            |
|        | 102  | Lex  | De Haan   | LDEHAAN    | 515.123.4569   | 1993-01-13<br>00:00:00.0          | AD_VP   | 17000  |                | 100        | 90 948-69-9018            |
|        | 103  | Alexander  | Hunokd  | AHUNOLD    | 590.423.4567   | 1990-01-03<br>00:00:00.0          | IT_PROG | 9000   |                | 102        | 60 544-68-5666            |
|        | 104  | Bruce  | Ernst   | BERNST     | 590.423.4568   | 1991-05-21                        | IT_PROG | 6000   |                | 103        | 60 473-40-4541            |

15. Navigate back to the first browser tab. Click on the Databases link.

| 1 |         |           |             |                  |          |         |        |               |                   |        |            |      |         |              |             |
|---|---------|-----------|-------------|------------------|----------|---------|--------|---------------|-------------------|--------|------------|------|---------|--------------|-------------|
|   | ORAC    | LC Enterp | rise Manage | r                |          |         |        |               |                   |        |            |      | Setup   | Preferences  | Help Logout |
|   | Grid Co | ntrol 11g | _           |                  |          |         | Home   | Targets       | Deployments       | Alerts | Compliance | Jobs | Reports | My Oracle :  | Support     |
|   | Hosts   | Databases | Middleware  | Web Applications | Services | Systems | Groups | Virtual Serve | ers   All Targets |        |            |      |         |              |             |
| ļ |         |           |             |                  |          |         |        |               |                   |        |            |      |         | Logged in As | SYSTEM      |

16. Scroll down to the bottom of the page and select the Data Masking Definitions link.

| Related Links  |   |  |
|--|---|--|
| Customize Table Columns<br>Dictionary Baselines<br>Execute SQL | Data Masking Definitions<br>Dictionary Comparisons<br>Recovery Catalogs | Data Masking Format Library<br>Dictionary Synchronizations |





17. In the Data Masking Definitions screen, click on the Create button.



18. From the Create Masking Definition screen, type in the Name, Database and Description field with the provided values below. Continue and click on the Add button.

Name: DETERMINISTIC\_MASKING\_EXAMPLE\_HR01

Database: db04.oracle.com

Description: Sample Deterministic Example

| Create I           | Masking De                              | finition  |  |                                |                             |                  |                          |                |         |
|--------------------|---|---|--|--------------------------------|-----------------------------|------------------|--------------------------|----------------|---------|
|                    |   |   |  |                                |                             |                  |                          | Cano           | el OK   |
|                    |   | * Name  | DETERMINISTIC_MASKI                            | NG_EXAMPLE                     |                             |                  |                          |                |         |
|                    |   | * Database  |  | 3                              |                             |                  |                          |                |         |
|                    |   | Description   | Sample Deterministic Exar                      |                                |                             |                  |                          |                |         |
| Colum              | ins                                     |   |  |                                |                             |                  |                          |                |         |
| Add col            | lumns you want t                        | o mask and define masking f                                   | ormat for each column. For                     | eign key columns are autor     | natically ackled to maintai | n referential in | tegrity. Dependent colum | ns are columns | that    |
| do not i<br>column | have foreign key<br>from this list will | constraints defined, but refe<br>remove all foreign key and d | rence a masked column due<br>ependent columns. | e to application level constra | ints. You can manually ac   | id dependent     | columns to a masked colu | mn. Removing   | Add     |
|                    |   |   |  |                                |                             |                  |                          | Dependent      | Columns |
| Select             | Owner                                   | Table   | Column   | Column Group                   | Data Type                   | Format           | Foreign Key Columns      | Count          | Add     |
|                    | No columns<br>added                     |   |  |                                |                             |                  |                          |                |         |

19. In the Add Columns screen, search for the EMPLOYEES table in the HR01 schema. Type in the following values and click on the Search button.

Schema: HR01 Table Name: EMPLOYEE

| Add Columns   |           |  |   |                     |                                    |  |                           |  |  |  |  |
|---|-----------|--|---|---------------------|------------------------------------|--|---------------------------|--|--|--|--|
| Database db04.oracle.com  |           |  |   | Logged In As system |                                    |  | Add Define Format And Add |  |  |  |  |
| Add one or more columns for masking. Foreign key columns will be added automatically. You can define masking format at once for all selected columns if they have the same data type. |           |  |   |                     |                                    |  |                           |  |  |  |  |
| Search  |           |  |   |                     |                                    |  |                           |  |  |  |  |
| Schema  | HR01      |  | 1 | Column Name         |                                    |  | ]                         |  |  |  |  |
| Table Name  | EMPLOYEES |  |   | Column Comment      |                                    |  | ]                         |  |  |  |  |
|   | Search    |  |   |                     | Enter a string in column comments. |  | -                         |  |  |  |  |

20. Select the column for EMAIL and click on the Add button.

| d Co   | lumns        |  |                                |        |                        |  |         |
|--------|--------------|--|--------------------------------|--------|------------------------|--|---------|
|        |              | Database db92.oracle.com mms for masking. Foreign key columns will be HR01 EMPLOYEES Search columns as a group None EMPLOYEES COLUMNS IN AIME EMPLOYEES COLUMNS IN AIME EMPLOYEES COUNTRY_ID EMPLOYEES DEPARTMENT, EMPLOYEES E |                                |        |                        | Logged in As system  | ancel   |
| oneo   | r more col   | umns for masking. For  | eign key columns will be added | automa | tically. You can defin | e masking format at once for all selected columns if they h  | ive the |
| Searc  | h            |  |                                |        |                        |  |         |
|        | Schema       | HR01   |                                | 1      | Column Name            |  |         |
| Tab    | ole Name     | EMPLOYEES  |                                | ]      | Column Comment         | 1  |         |
|        |              | Search   |                                | ·      |                        | Enter a string in column comments.   |         |
| 🗆 Ma   | isk selecter | d columns as a group   |                                |        |                        |  |         |
| Select | All Selec    | t None   | O aluma Nama                   |        | Data Tura              |  |         |
| Select | Owner        | Table Name   | Column Name                    |        | Data Type C            | comment  |         |
|        | HR01         | EMPLOYEES  | CITY                           |        | VARCHAR2(30)           |  |         |
|        | HR01         | EMPLOYEES  | COMMISSION_PCT                 |        | NUMBER(2,2)            | Commission percentage of the employee; Only employees<br>ales department elgible for commission percentage | in      |
|        | HR01         | EMPLOYEES  | COUNTRY_ID                     |        | CHAR(2)                |  |         |
|        | HR01         | EMPLOYEES  | DEPARTMENT_ID                  |        | NUMBER(4)              | Department id where employee works; foreign key to<br>lecartment id column of the departments table        |         |
|        | HR01         | EMPLOYEES  | EMAIL                          |        | VARCHAR2(100)          | IASK candidate: HR Privacy Policy  |         |
|        | LIPO1        | ENDI OVEES   | EMPLOYEE ID                    |        | NUMPER                 | 18 CV condidate: HP Penelite Palicy  |         |

21. Click on the Format icon.

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| Columns   |                    |                           |                           |              |               |        |             |           |         |  |  |  |
|---|--------------------|---------------------------|---------------------------|--------------|---------------|--------|-------------|-----------|---------|--|--|--|
| Add columns you want to mask and define masking format for each column. Foreign key columns are automatically added to maintain referential integrity. Dependent columns are columns that |                    |                           |                           |              |               |        |             |           |         |  |  |  |
| do not have foreign key constraints defined, but reference a masked column due to application level constraints. You can manually add dependent columns to a masked column. Removing a    |                    |                           |                           |              |               |        |             |           |         |  |  |  |
| column from   | this list will rem | ove all foreign key and   | dependent columns.        |              |               |        |             |           | Add     |  |  |  |
| Remove  |                    |                           |                           |              |               |        |             |           |         |  |  |  |
| Select All  | Select None        |                           |                           |              |               |        |             |           |         |  |  |  |
|   |                    |                           |                           |              |               |        | Foreign Key | Dependent | Columns |  |  |  |
| Select Owne   | er                 | lable                     | Column                    | Column Group | Data Type     | Format | Columns     | Count     | Add     |  |  |  |
| HR01  | 1                  | EMPLOYEES                 | EMAIL                     |              | VARCHAR2(100) | 14     | 0           | 0         | ф       |  |  |  |
| 1 00  | lumns that hav     | e this icon do not have a | a masking format defined. |              |               |        |             |           |         |  |  |  |

22. In the Define Column Mask section, choose the Format Entry of Substitute and click on the Add button.

| Denne Column wask   |                          |                                |                            |                              |                      |                              |                   |
|---|--------------------------|--------------------------------|----------------------------|------------------------------|----------------------|------------------------------|-------------------|
| Owner   | HR01                     |                                | Table                      | EMPLOYEES                    |                      |                              | Cancel OK         |
| Column  | EMAIL                    |                                | Data Type                  | VARCHAR2(100)                |                      |                              |                   |
| By default all records in the table will be   | masked using the spec    | ified format. You can option   | ally identify more than or | ne subset of records         | using conditions. Ea | ch subset can be masked usin | g a corresponding |
| asking format. The subsets will be ma   | sked in the order they a | are specified. A subset will n | ot be masked again ever    | n when it matches a          | subsequent condition | 1.                           |                   |
|   |                          |                                |                            |                              |                      |                              |                   |
|   |                          |                                |                            |                              |                      |                              | Add Condition     |
|   |                          |                                |                            |                              |                      |                              |                   |
| (Import Format ) Format Entry   | Substitute               | add                            |                            |                              |                      |                              |                   |
| Expand All Collapse All   | Substitute               |                                |                            |                              |                      |                              |                   |
| Expand All   Collapse All   | Substitute               |                                | Format                     | Entry Properties             |                      |                              |                   |
| Espand Al   Collapse Al   | Substitute               | Property                       | Format  <br>Value          | Entry Properties<br>Property | Value                | Sample                       | Remove            |
| Expand Al   Collapse Al<br>Select Condition<br>V Conditions   | Substitute               | Property                       | Format  <br>Value          | Entry Properties<br>Property | Value                | Sample                       | Remove            |
| Expand All Collapse All      Select Condition      Conditions      Product Condition      Default Condition | Substitute               | Property                       | Format  <br>Value          | Entry Properties<br>Property | Value                | Sample                       | Remove            |

23. Enter the Table Name OE.CUSTOMERS and the Column Name CUST\_EMAIL to be used for the substitute values. Click on the OK button to proceed.

| Define Column Mask   |   |   |   |  |   |                                 |                       |
|--|---|---|---|--|---|---------------------------------|-----------------------|
| Owner  | HR01  |   | Table   | EMPLOYEES                                      |   |                                 | Cancel OK             |
| Column   | EMAIL   |   | Data Type                                       | VARCHAR2(100)                                  |   |                                 |                       |
| By default all records in the table will be<br>masking format. The subsets will be ma<br>Import Format. Format Entry | e masked using the sp<br>asked in the order the<br>Substitute | ecified format. You can option<br>ay are specified. A subset will n | ally identify more than<br>ot be masked again e | one subset of records<br>ven when it matches a | using conditions. E<br>subsequent conditi | ach subset can be masked<br>on. | using a corresponding |
| Expand All Collapse All  |   |   |   |  |   |                                 |                       |
|  |   |   | Format  | Entry Properties                               |   |                                 |                       |
| Select Condition   |   | Property  | Value   | Property                                       | Value                                     | Sample                          | Remove                |
| Conditions   |   |   |   |  |   |                                 |                       |
| <ul> <li>Ø Default Condition</li> </ul>  |   |   |   |  |   | B                               |                       |
| Substitute   |   | Table Name  |   | Column Name                                    | CUST_EMAIL                                | ]                               | Z                     |
|  |   |   |   |  |   |                                 | Cancel (OK            |

24. After the Masking Definition has been created, click on the OK button.

|   | -  |  |   |   |   |                                 |   | Canc   | el) (OK                     |
|---|--|--|---|---|---|---------------------------------|---|--|-----------------------------|
|   |  | * Name   | DETERMINISTIC_MAS   | KING_EXAMPLE  |   |                                 |   |  | 5                           |
|   |  | * Database   | db04.oracle.com   |   |   | <i>3</i>                        |   |  |                             |
|   |  | Description  | Sample Deterministic E  | ample   |   |                                 |   |  |                             |
|   |  |  |   |   |   |                                 |   |  |                             |
| Add co  | nns<br>Iumns vou want to   | mask and define masking f  | ormat for each column. I  | Foreion kev columns are auto  | matically added to maintain                                 | referential in                  | earity. Dependent colum   | is are columns i   | that                        |
| Add co<br>do not<br>column                                | nns<br>Iumns you want to<br>have foreign key o<br>I from this list will n  | mask and define masking f<br>onstraints defined, but refer<br>move all foreign key and d     | ormat for each column. I<br>ence a masked column e<br>ependent columns. | Foreign key columns are auto<br>due to application level constr                 | omatically added to maintain<br>aints. You can manually add | referential in<br>I dependent d | egrity. Dependent column<br>columns to a masked colu                        | is are columns i<br>mn. Removing a                         | that<br>a<br>Ad             |
| Add co<br>do not<br>column                                | nns<br>lumns you want to<br>have foreign key o<br>I from this list will n<br>move  | mask and define masking for<br>onstraints defined, but refer<br>emove all foreign key and de | ormat for each column. I<br>ence a masked column<br>ependent columns.   | Foreign key columns are auto  | matically added to maintain<br>aints. You can manually add  | referential in<br>I dependent ( | egrity. Dependent column<br>columns to a masked colu                        | is are columns i<br>nn. Removing a                         | that<br>a<br>Ad             |
| Add co<br>do not<br>column<br>(Rer<br>Select              | nns<br>Iumns you want to<br>have foreign key o<br>form this list will m<br>move)<br>All Select None  | mask and define masking f<br>onstraints defined, but refer<br>emove all foreign key and di   | ormat for each column. I<br>ence a masked column<br>ependent columns.   | Foreign key columns are auto<br>due to application level constr                 | matically added to maintain<br>aints. You can manually add  | referential in<br>I dependent d | egrity. Dependent colum<br>columns to a masked colu                         | is are columns i<br>mn. Removing a                         | that<br>a<br>Ac             |
| Add co<br>do not<br>column<br><u>Rer</u><br><u>Select</u> | https://www.com/commons/co | mask and define masking f<br>onstraints defined, but refer<br>amove all foreign key and de   | ormat for each column. I<br>ence a masked column<br>ependent columns.   | Foreign key columns are auto<br>due to application level constr<br>Column Group | matically added to maintain<br>aints. You can manually add  | referential in<br>I dependent d | egrity. Dependent column<br>columns to a masked colu<br>Foreign Key Columns | is are columns i<br>mn. Removing a<br>Dependent (<br>Count | that<br>Ad<br>Column<br>Add |



25. As you have completed in previous exercises, click on the Generate Script button.

| Data Masking Definitions   |  |  |  |  |
|--|--|--|--|--|
| Data masking is the process of making sensitive information in tee<br>masking definition defines the columns to be masked and the forr<br>contains a collection of ready-to-use masking formats. | st or non-production data<br>mat of masked data. You | bases safe. It disguises sensitive inforr<br>can create a new masking definition o | nation by overwriting it with realistic k<br>r use an existing definition for a mask | coking but false data of a similar type. A<br>sing operation. The Format Library |
| Search Masking Definition  | Go   |  |  | (Import) (Create   |
| (View) Edit) Create Like Generate Script) Schedule Job   | Export Clone Databa                                  | use Delete   |  |  |
| Select Masking Definition  | Database   | Description  | Columns Status   | Most Recent Job Ended  |
|  |  |  |  |  |

26. After the script has been generated, click on the Schedule Job button.

| Data masking script generation completed successfully.  |                    |      |
|---|--------------------|------|
| crint Constation Results: DETERMINISTIC MASKING EXAMPLE |                    |      |
| chpt deneration results. DETERMINISTIC_MASKING_EXAMPLE  |                    |      |
| Database db04.oracle.com                                | Number of Tables 1 | Reti |
| Logged in As system                                     | Columns 1          |      |
|   |                    |      |
| Script Options  |                    |      |

27. Provide the user credentials provided for the oracle user using the password provided (i.e. g0Oracle12#), a Substitute Format Seed (for example, a string "123456"), and click on the Submit button.

To properly show Deterministic masking in this exercise, you must use the same Seed value for both masking jobs. New in EM 11g, Substitute Format Seeds have been introduced. This allows the user to provide seed values and have better control over non-deterministic and deterministic masking.

| Database<br>Logged in As                     | db04.oracle.com<br>system       |                   | Number of Ta<br>Colu            | mns 1      | Submi |
|--|---------------------------------|-------------------|---------------------------------|------------|-------|
|  |                                 | Name MASKIN       | IG_JOB_101                      | ]          |       |
|  | Job De                          | ription           |                                 | Ĩ          |       |
|  | <ul> <li>Script File</li> </ul> | cation /u01/ora   | cle/product/11.2.0/dbhome_1/dbs | Ĩ <i>.</i> |       |
|  | * Script F                      | Name masking      | 101.sql                         | Ĩ          |       |
| Substitute Format Seed                       |                                 |                   |                                 | 2          |       |
| A seed is required for masking definitions t | hat use the Substitute          | ormat. The seed c | an be any text string.          |            |       |
|  | * Seed                          |                   |                                 |            |       |
|  | * Confirm Seed                  |                   |                                 |            |       |
| Host Credentials                             |                                 |                   |                                 |            |       |
|  | <ul> <li>Username</li> </ul>    | racle             |                                 |            |       |
|  | * Password                      |                   |                                 |            |       |
| I I I I I I I I I I I I I I I I I I I        | -                               | Save as Preferr   | red Credential                  |            |       |
| ob 4   |                                 |                   |                                 |            |       |
| Start  |                                 |                   |                                 |            |       |
| Immediately                                  |                                 |                   |                                 |            |       |
| ∪ Later                                      |                                 |                   |                                 |            |       |

#### 28. One the Masking job is complete, move to the next step.

| Data Masking Definitions  |  |  |   |   |
|---|--|--|---|---|
| Data masking is the process of making sensitive informatik<br>masking definition defines the columns to be masked and<br>contains a collection of ready-to-use masking formats. | on in test or non-pro<br>the format of maske | duction databases safe. It disguises sen<br>d data. You can create a new masking ( | sitive information by overwriting it with rea<br>definition or use an existing definition for a | listic looking but false data of a similar type. A<br>masking operation. The Format Library |
| Search Database 💠 'db04.oracie.com'   |  | Go   |   | (Import) Create   |
| View Edit Generate Script Schedule Job  | Delete Actions                               | Clone Database   |   |   |
| Select Masking Definition 🛆   | Database                                     | Description  | Columns Status  | Most Recent Job Ended   |
| DETERMINISTIC MASKING EXAMPLE   | db04.oracle.com                              | Sample Deterministic Example   | 1 Masking Job Succeeded   | Jul 28, 2010 9:29:39 PM GMT+00:00   |

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29. In the second browser tab, click on the Tables link.

| Database<br>View | e Instance: db04.orack<br>Data for Table                             | e: HR01.EN   | ><br>IPLOYEES   |  |  |                                   |         |        |                |            | Logg       | ed in As SYSTEM |     |
|------------------|--|--|---|--|--|-----------------------------------|---------|--------|----------------|------------|------------|-----------------|-----|
| Query            | SELECT 'EMPLO<br>'HIRE_DATE', 'X<br>'NATIONAL_ID',<br>'COUNTRY_ID' F | YEE_ID', 'FIR:<br>DB_ID', 'SALAI<br>'STREET_ADD<br>'ROM 'HR01'.' | ST_NAME', 'L<br>RY', 'COMMIS<br>IRESS', 'POS'<br>EMPLOYEES' | AST_NAME",<br>SION_PCT", '<br>"AL_CODE", ' | 'EMAIL', 'PHONE_I<br>'MANAGER_ID', 'D<br>'CITY', 'STATE_PR | NUMBER*,<br>EPARTMEN*<br>OVINCE*, | r_id*,  |        |                |            | Refine     | Query OK        |     |
| Result           |  |  |   |  |  |                                   |         |        |                |            |            |                 |     |
|                  |  | FIRST_NAME   | LAST_NAME   | EMAIL                                      | PHONE_NUMBER   | HIRE_DATE                         | JOB_ID  | SALARY | COMMISSION_PCT | MANAGER_ID | DEPARTMENT | ID NATIONAL_I   | ) S |
|                  | 100  | Steven   | King  | SKING                                      | 515.123.4567   | 1987-06-17<br>00:00:00.0          | AD_PRES | 24000  |                |            |            | 90 494-17-9546  | 2   |
|                  | 101  | Neena  | Kochhar   | NKOCHHAR                                   | 515.123.4568   | 1989-09-21                        | AD_VP   | 17000  |                | 100        |            | 90 625-15-1353  | 2   |

30. Query the HR01 schema and the EMPLOYEES table. Click on the Go button. Select the Action to View Data and click on the Go button. View the masked data.

| bles                          |  |                                  |  |   |        |
|-------------------------------|--|----------------------------------|--|---|--------|
|                               |  |                                  |  | Object Type Table   | \$     |
| Search                        |  |                                  |  |   |        |
| Select an object type a       | nd optionally enter a schema name a          | and an object name to filte      | er the data that is displayed in your r      | results set.  |        |
| Schema HR01                   |  | <i>\$</i>                        |  |   |        |
| Object Name EMPLO             | DYEES  |                                  |  |   |        |
| Go                            |  |                                  |  |   |        |
| By default, the search return | s all uppercase matches beginning with the s | tring you entered. To run an exa | ictor case-sensifive match, double quote fre | search string. You can use the wildcard symbol (%) in a double quoted string. |        |
| Selection Mode Sing           | gie 🗘  |                                  |  | C   | Create |
| Edit View Del                 | lete With Options Actions View D             | )ata 🗘                           | 60   |   |        |
| Select Schema 🛆               | Table Name                                   | Tablespace                       | Partitioned                                  | Rows Last Analyzed  |        |
| HR01                          | EMPLOYEES                                    | EXAMPLE                          | NO   | 107 Jul 28, 2010 9:29:28 PM UTC   |        |

31. Click on the EMPLOYEE\_ID column to sort the data. Keep this tab open. We will now mask the data on HR02 to demonstrate the results of the deterministic masking capability.

| Grid C           | CLE Enterprise<br>ontrol                                    | e Manager 10g<br>Middleware I                                     | Web Applicatio  | ns   Service                                | s i Svstems i Gro   | ups   All Tar            | qets     | Home   | Fargets | Deployme | nts Alerts | Setup Pre<br>Compliance | lerences <u>Help</u><br>Jobs Re | p <u>Logout</u><br>eports |
|------------------|---|---|---|---|---|--------------------------|----------|--------|---------|----------|------------|-------------------------|---------------------------------|---------------------------|
| Database<br>View | e Instance: db02.on<br>Data for Tab                         | ncle.com > Tabl   | ⊨s<br>MPLOYEE   | S   |   |                          |          |        |         |          |            | L.                      | .ogged in A                     | s SYSTEM                  |
|                  |   |   |   |   |   |                          |          |        |         |          |            | (                       | Refine Quer                     | ry OK                     |
| Query            | SELECT 'EMPL<br>'HIRE_DATE',<br>'NATIONAL_ID<br>'COUNTRY_ID | .OYEE_ID', 'FI<br>'JOB_ID', 'SAL<br>', 'STREET_AI<br>' FROM 'HR01 | RST_NAME', 'COMM<br>LARY', 'COMM<br>DDRESS', 'PO<br>'.'EMPLOYEE | 'LAST_NAME<br>ISSION_PCT<br>STAL_CODE<br>S' | ", "EMAIL", "PHONE<br>", "MANAGER_ID",<br>", "CITY", "STATE_I | DEPARTME<br>ROVINCE',    | NT_ID*,  |        |         |          |            |                         |                                 |                           |
| Result           |   |   |   |   |   |                          |          |        |         |          |            |                         |                                 |                           |
|                  | EMPLOYEE_ID   | FIRST_NAME  | LAST_NAME   | EMAIL                                       | PHONE_NUMBER  | HIRE_DATE                | JOB_ID   | SALARY | COMMISS | ION_PCT  | MANAGER_I  | DEPARTMENT              |                                 | DNAL_ID S                 |
|                  | 183   | Girard  | Geoni   | GGEONI                                      | 650.507.9879  | 2000-02-03<br>00:00:00.0 | SH_CLERK | 2800   |         |          | 12         | D                       | 50 372-96                       | 6-6146 20                 |

32. Navigate back to the first browser tab. Click on the Create button to create the same masking definition with the only exception being the use of the HR02 table.

| GracLe Enterprise Manager 10g  |  |  | Home Targets Deployments   | Setup Preferences Help Logout<br>Alerts Compliance Jobs Reports                          |
|--|--|--|--|--|
| Hosts   Databases   Middleware   Web Applications   Ser  | vices   Systems                            | Groups   All Targets   |  |  |
| Data Masking Definitions   |  |  |  |  |
| Data masking is the process of making sensitive information in ter<br>masking definition defines the columns to be masked and the form<br>contains a collection of ready-to-use masking formats. | st or non-production<br>mat of masked data | databases safe. It disguises sensitiv<br>You can create a new masking defi | e information by overwriting it with realist<br>nition or use an existing definition for a m | tic looking but false data of a similar type. A<br>lasking operation. The Format Library |
| Search Database 🗘 'db02.oracle.com'  | Go   |  |  | (Import) Create  |
| View Edit Create Like Generate Script Schedule Job   | Export Clone D                             | atabase) Delete  |  |  |
| Select Masking Definition /  | Database                                   | Description  | Columns Status   | Most Recent Job Ended  |
| DETERMINISTIC MASKING EXAMPLE HR01   | db02.oracle.com                            | Simple Deterministic Example   | 1 Masking Job Succeeded  | Jan 8, 2010 8:11:17 AM (UTC+00:00)   |



- 33. From the Create Masking Definition screen, type in the Name, Database and Description field with the provided values below. Continue and click on the Add button.
  - Name: DETERMINISTIC\_MASKING\_EXAMPLE\_HR02
  - Database: db04.oracle.com

Description: Sample Deterministic Example

|                                      |   |   |   |   |   |  |  | Cance  | el O                      |
|--------------------------------------|---|---|---|---|---|--|--|--|---------------------------|
|                                      |   | * Name  | DETERMINISTIC_MASK  | ING_EXAMPLE_HR02  |   |  |  |  |                           |
|                                      |   | * Database  | db04.oracle.com   |   | j   | 8  |  |  |                           |
|                                      |   | Description   | Simple Deterministic Exan   | npie  |   |  |  |  |                           |
| Colun                                | nns   |   |   |   |   |  |  |  |                           |
| ooluli                               |   |   |   |   |   |  |  |  |                           |
| Add co<br>do not                     | lumns you want t<br>have foreign key<br>i from this list will           | o mask and define masking<br>constraints defined, but refe<br>remove all foreign key and o          | format for each column. Fo<br>erence a masked column du<br>dependent columns. | reign key columns are auto<br>e to application level constr                 | matically added to maintain<br>aints. You can manually ac               | n referential in<br>Id dependent           | tegrity. Dependent columr<br>columns to a masked colu                        | ns are columns t<br>mn. Removing a                         | that<br>a                 |
| Addicc<br>do not                     | lumns you want t<br>have foreign key<br>i from this list will           | o mask and define masking<br>constraints defined, but refe<br>remove all foreign key and o          | format for each column. Fo<br>erence a masked column du<br>dependent columns. | reign key columns are auto<br>e to application level constr                 | matically ackled to maintai<br>aints. You can manually ac               | n referential in<br>Id dependent           | tegrity. Dependent column<br>columns to a masked colu                        | ns are columns t<br>mn. Removing a<br>Dependent C          | that<br>A<br>Column       |
| Add co<br>do not<br>column<br>Select | lumns you want the<br>have foreign key<br>from this list will<br>towner | o mask and define masking<br>constraints defined, but refe<br>remove all foreign key and o<br>Table | format for each column. Fo<br>rence a masked column du<br>dependent columns.  | reign key columns are auto<br>e to application level constr<br>Column Group | matically ackled to maintain<br>aints. You can manually ac<br>Data Type | n referential in<br>Id dependent<br>Format | tegrity. Dependent column<br>columns to a masked colu<br>Foreign Key Columns | ns are columns t<br>mn. Removing a<br>Dependent C<br>Count | that<br>1<br>Colum<br>Ade |

34. In the Add Columns screen, search for the EMPLOYEES table in the HR02 schema. Type in the following values and click on the Search button.

Schema: HR02 Table Name: EMPLOYEE

| Add Columns          | Idd Columns   |                 |   |                |                            |          |                           |  |  |  |
|----------------------|---|-----------------|---|----------------|----------------------------|----------|---------------------------|--|--|--|
|                      | Database  | db04.oracle.com |   | Logged         | In As <b>system</b>        | Cancel ( | Add Define Format And Add |  |  |  |
| Add one or more colu | d one or more columns for masking. Foreign key columns will be added automatically. You can define masking format at once for all selected columns if they have the same data type. |                 |   |                |                            |          |                           |  |  |  |
| Search               |   |                 |   |                |                            |          |                           |  |  |  |
| Schema               | HR02  |                 | 1 | Column Name    |                            |          | ]                         |  |  |  |
| Table Name           | EMPLOYEES   |                 |   | Column Comment |                            |          | ]                         |  |  |  |
| [                    | (Search)  |                 |   |                | inter a string in column c | ommen b. | -                         |  |  |  |

35. Select the column for EMAIL and click on the Add button.

|        |             | Database          | db04.oracle.com                  |             | L                  | .ogged in As system (Car  | 1cel Add Define Forr        | nat And A |
|--------|-------------|-------------------|----------------------------------|-------------|--------------------|---|-----------------------------|-----------|
| one o  | r more colu | umns for masking. | Foreign key columns will be adde | d automatic | cally. You can def | ine masking format at once for all selected columns if the  | ry have the same data type. |           |
| Searc  | h           |                   |                                  |             |                    |   |                             |           |
|        | Schema      | HR02              |                                  | ] 🦪         | Column N           | ame   |                             |           |
| Та     | ble Name    | EMPLOYEES         |                                  | ٦           | Column Comr        | ment  |                             |           |
|        |             | Search            |                                  | _           |                    | Enter a string in column comments.  |                             |           |
| Select | t Owner     | Table Name        | Column Name                      | , I         | Data Type          | Comment   |                             |           |
|        | HR02        | EMPLOYEES         | CITY                             | N           | VARCHAR2(30)       |   |                             |           |
|        | HR02        | EMPLOYEES         | COMMISSION_PCT                   | r           | VUMBER(2,2)        | Commission percentage of the employee; Only employe<br>sales department elgible for commission percentage | ees in                      |           |
|        | HR02        | EMPLOYEES         | COUNTRY_ID                       | c           | CHAR(2)            |   |                             |           |
|        | HR02        | EMPLOYEES         | DEPARTMENT_ID                    | P           | NUMBER(4)          | Department id where employee works; foreign key to<br>department_id column of the departments table       |                             |           |
|        | HR02        | EMPLOYEES         | EMAIL                            | V           | VARCHAR2(100)      | MASK candidate: HR Privacy Policy   |                             |           |
|        | HR02        | EMPLOYEES         | EMPLOYEE_ID                      | P           | NUMBER             | MASK candidate: HR Benefits Policy  | _                           |           |
| _      |             |                   |                                  |             |                    |   |                             |           |

36. Click on the Format icon.

| Colum  | nns              |                                |                             |                                   |                                  |                     |                   |                  |        |
|--------|------------------|--------------------------------|-----------------------------|-----------------------------------|----------------------------------|---------------------|-------------------|------------------|--------|
| Add co | olumns you wa    | ant to mask and define mask    | ing format for each column. | Foreign key columns are autom     | atically added to maintain refer | ential integrity. D | ependent column   | s are columns th | at     |
| do not | have foreign     | key constraints defined, but i | reference a masked column   | due to application level constrai | nts. You can manually add dep    | endent columns      | to a masked colur | nn. Removing a   |        |
| column | n from this list | will remove all foreign key ar | nd dependent columns.       |                                   |                                  |                     |                   |                  | Add    |
| Rem    | nove             |                                |                             |                                   |                                  |                     |                   |                  |        |
| Select | All              | one                            |                             |                                   |                                  |                     |                   |                  |        |
|        |                  |                                |                             |                                   |                                  |                     | Foreign Key       | Dependent C      | olumns |
| Select | tOwner           | Table                          | Column                      | Column Group                      | Data Type                        | Format              | Columns           | Count            | Add    |
|        | HR02             | EMPLOYEES                      | EMAIL                       |                                   | VARCHAR2(100)                    | 12                  | 0                 | 0                | ф      |
| 1      | Columns ti       | hat have this icon do not hav  | e a masking format defined  |                                   |                                  | -                   |                   |                  |        |



37. In the Define Column Mask section, choose the Format Entry of Substitute and click on the Add button.



38. Enter the Table Name OE.CUSTOMERS and the Column Name CUST\_EMAIL to be used for the substitute values. Click on the OK button to proceed.

| Define Column Mask                  |           |                     |                                    |                          |                       |                      |                          |                       |
|-------------------------------------|-----------|---------------------|------------------------------------|--------------------------|-----------------------|----------------------|--------------------------|-----------------------|
| (                                   | Owner     | HR02                |                                    | Table                    | EMPLOYEES             |                      |                          | Cancel OK             |
| c                                   | olumn     | EMAIL               |                                    | Data Type                | VARCHAR2(100)         |                      |                          |                       |
| By default all records in the table | e will be | masked using the    | specified format. You can option   | nally identify more than | one subset of records | using conditions. Ea | ach subset can be masked | using a corresponding |
| masking format. The subsets wi      | il be ma  | sked in the order t | hey are specified. A subset will r | not be masked again e    | ven when it matches a | subsequent conditio  | n.                       |                       |
|                                     |           |                     |                                    |                          |                       |                      |                          | Add Condition         |
|                                     | 6         |                     | 1                                  |                          |                       |                      |                          | (Add Condition        |
| Import Format Format E              | intry     | Substitute          | add                                |                          |                       |                      |                          |                       |
| Expand All Collapse All             |           |                     |                                    |                          |                       |                      |                          |                       |
|                                     |           |                     |                                    | Format                   | Entry Properties      |                      |                          |                       |
| Select Condition                    |           |                     | Property                           | Value                    | Property              | Value                | Sample                   | Remove                |
| Conditions                          |           |                     |                                    |                          |                       |                      |                          |                       |
| Operation                           |           |                     |                                    |                          |                       |                      | R                        |                       |
| Substitute                          |           |                     | Table Name                         | OE.CUSTOME               | Column Name           | CUST_EMAIL           |                          |                       |
|                                     |           |                     |                                    | 1                        | 1                     |                      | -                        | *                     |
|                                     |           |                     |                                    |                          |                       | 200                  |                          |                       |

39. After the Masking Definition has been created, click on the OK button.

|  |   |  |  |  |   |  |  | Canc   | el O                                    |
|--|---|--|--|--|---|--|--|--|---|
|  |   | * Name   | DETERMINISTIC  | _MASKING_EXAMPLE_HR02  |   |  |  |  | · · · ·                                 |
|  |   | * Database   | db04.oracle.com  |  |   | <i>3</i>                                   |  |  |   |
|  |   | Description  | Simple Determinis  | tic Example  |   |  |  |  |   |
| Columns  |   |  |  |  |   |  |  |  |   |
|  |   |  |  |  |   |  |  |  |   |
| Add o  | olumns you want ti  | o mask and define masking t  | iormat for each colu   | ımn. Foreign key columns are a   | utomatically added to mainta  | n referential in                           | tegrity. Dependent colum   | ns are columns f   | that                                    |
| Addica<br>do not                                   | olumns you want ti<br>have foreign key  | o mask and define masking t<br>constraints defined, but refe                                 | format for each colu<br>rence a masked col                       | umn. Foreign key columns are a<br>lumn due to application level cor                | utomatically added to mainta<br>straints. You can manually a                | n referential in<br>dd dependent           | tegrity. Dependent column<br>columns to a masked colu                        | ns are columns f<br>mn. Removing a                         | that<br>a                               |
| Add oo<br>do not<br>colum                          | olumns you want ti<br>have foreign key<br>n from this list will   | o mask and define masking i<br>constraints defined, but refe<br>remove all foreign key and d | iormat for each colu<br>rence a masked col<br>lependent columns. | imn. Foreign key columns are a<br>lumn due to application kevel cor                | utomatically added to mainta<br>straints. You can manually a                | n referential in<br>dd dependent           | tegrity. Dependent colum<br>columns to a masked colu                         | ns are columns f<br>mn. Removing a                         | that<br>a<br>Ad                         |
| Add or<br>do not<br>colum<br>(Re                   | olumns you want ti<br>have foreign key<br>n from this list will<br>move   | o mask and define masking I<br>constraints defined, but refe<br>remove all foreign key and d | format for each colu<br>rence a masked col<br>lependent columns. | imn. Foreign key columns are a<br>lumn due to application level col                | utomatically added to mainta<br>Istraints. You can manually a               | n referential in<br>dd dependent           | tegrity. Dependent colum<br>columns to a masked colu                         | ns are columns f<br>mn. Removing a                         | that<br>a<br>(Ac                        |
| Add or<br>do not<br>colum<br>(Re<br>Selec          | olumns you want to<br>have foreign key<br>n from this list will<br>move<br>t All   Select None                    | o mask and define masking i<br>constraints defined, but refe<br>remove all foreign key and d | format for each colu<br>rence a masked col<br>lependent columns. | imn. Foreign key columns are a<br>lumn due to application level con                | utomatically added to mainta<br>Istraints. You can manually a               | n referential in<br>dd dependent           | tegrity. Dependent colum<br>columns to a masked colu                         | ns are columns i<br>mn. Removing a                         | that<br>a<br>Ac                         |
| Add or<br>do not<br>colum<br><u>Re</u>             | olumns you want ti<br>: have foreign key<br>n from this list will i<br>move)<br>t <u>All</u>   <u>Select None</u> | o mask and define masking i<br>constraints defined, but refe<br>remove all foreign key and d | format for each colu<br>rence a masked col<br>lependent columns. | imn. Foreign key columns are a<br>jumn due to application level cor                | utomatically added to mainta<br>istraints. You can manually a               | n referential in<br>dd dependent           | tegrity. Dependent colum<br>columns to a masked colu                         | ns are columns f<br>mn. Removing a<br>Dependent (          | that<br>a<br>Ac                         |
| Add oo<br>do not<br>colum<br><u>Reiec</u><br>Selec | olumns you want ti<br>thave foreign key<br>n from this list will i<br>move)<br>t All   Select None<br>t Owner     | o mask and define masking i<br>constraints defined, but refe<br>remove all foreign key and d | format for each colu<br>rence a masked col<br>lependent columns. | imn. Foreign key columns are a<br>umn due to application level con<br>Column Group | utomatically ackied to mainta<br>istraints. You can manually a<br>Data Type | n referential in<br>dd dependent<br>Format | tegrity. Dependent column<br>columns to a masked colu<br>Foreign Key Columns | ns are columns f<br>mn. Removing a<br>Dependent (<br>Count | that<br>a<br><u>Ac</u><br>Column<br>Add |

40. As you have completed in previous exercises, click on the Generate Script button.

| Data Masking Definitions   |                    |                              |         |                      |                       |  |  |
|--|--------------------|------------------------------|---------|----------------------|-----------------------|--|--|
| Data masking is the process of making sensitive information in test or non-production databases safe. It diguises sensitive information by overwriting it with realistic booking but fake data of a similar type. A masking definition defines the columns to be masked and the format of masked data. You can create a new masking definition or use an existing definition for a masking operation. The Format Library contains a collection of ready-to-use masking definition of ready-to-use masking definition of ready-to-use masking definition. |                    |                              |         |                      |                       |  |  |
| Search Database 🔹 'dt04.oracle.com' Co   |                    |                              |         |                      |                       |  |  |
| View Edit Generate Script Schedule Job Delete  | Actions Clone Data | base 🗘 Go                    |         |                      |                       |  |  |
| Select Masking Definition 🛆  | Database           | Description                  | Columns | Status               | Most Recent Job Ended |  |  |
| O DETERMINISTIC MASKING EXAMPLE HR01   | db04.oracle.com    | Sample Deterministic Example | 1       | Script Generated     |                       |  |  |
| DETERMINISTIC MASKING EXAMPLE HR02   | db04.oracle.com    | Simple Deterministic Example | 1       | Script Not Generated |                       |  |  |

41. After the script has been generated, click on the Schedule Job button.



| Data masking script generation completed successfully.  |                    |        |  |  |  |  |
|---|--------------------|--------|--|--|--|--|
| cript Generation Results: DETERMINISTIC_MASKING_EXAMPLE   | E_HR02             |        |  |  |  |  |
| Database db04.oracle.com  | Number of Tables 1 | Return |  |  |  |  |
| Logged in As system   | Columns 1          |        |  |  |  |  |
| Script Options  |                    |        |  |  |  |  |
| Use script to clone and mask the database. Clone And Mask   |                    |        |  |  |  |  |
| Script Options Use script to chore and mask the database. Clone And Mask. Schedule the this masking bit. The script will be executed by the job to perform the masking operation Schedule tob |                    |        |  |  |  |  |

42. Provide the user credentials provided for the oracle user using the password provided (i.e. g0Oracle12#), the same Substitute Format Seed (i.e. seedtextstring) used in the previous step, and click on the Submit button.

Again, to properly show Deterministic masking in this exercise, you must use the same Seed value for both masking jobs.

| Schedule Data Masking Job: DE                  | TERMINISTIC_                    | MASKI     | NG_EXAMPLE_HR02                         |            |       |               |
|--|---------------------------------|-----------|---|------------|-------|---------------|
| Database                                       | db04.oracle.com                 |           | Numbe                                   | er of Tabl | les 1 | Cancel Submit |
| Logged In As                                   | system                          |           | Columns 1                               |            |       |               |
|  | * Ja                            | b Name    | MASKING_JOB_108                         |            |       |               |
|  | Job De                          | scription |   |            |       |               |
|  | <ul> <li>Script File</li> </ul> | Location  | /u01/oracle/product/11.2.0/dbhome_1/dbs |            | \$    |               |
|  | <ul> <li>Script Fi</li> </ul>   | le Name   | masking108.sql                          |            |       |               |
| Substitute Format Seed                         |                                 |           |   |            |       |               |
| A seed is required for masking definitions the | nat use the Substitute          | format. T | he seed can be any text string.         |            |       |               |
|  | * Seed                          |           |   |            |       |               |
|  | * Confirm Seed                  |           |   |            |       |               |
| Host Credentials                               |                                 |           |   |            |       |               |
|  | * Username                      | oracle    |   |            |       |               |
|  | * Password                      |           |   |            |       |               |
|  |                                 | Save :    | as Preferred Credential                 |            |       |               |
| <b>a</b> t. 1                                  |                                 |           |   |            |       |               |
| Start  |                                 |           |   |            |       |               |
| Immediately                                    |                                 |           |   |            |       |               |
| O Later  |                                 |           |   |            |       |               |
| Date Jul 28, 2010                              |                                 |           |   |            |       |               |

43. Once the masking job is complete, click on Databases link.

| ORACLE Enterprise Manager<br>Grid Control 11a<br>Hoats Databases Middleware   Web Applications   Ser<br>Data Masking Definitions  | vices   Systems   G | Home Targets                 | Deployments Alerts Compliance Al Targets | Setup Preferences Help Logout<br>Jobs Reports My Oracle Support |  |  |  |  |
|---|---------------------|------------------------------|--|---|--|--|--|--|
| Data masking bernintenses<br>Data masking is the process of making sensitive information in test or non-production databases safe. It disguises sensitive information by overwriting it with realistic boking but faite data of a similar type. A<br>masking definition defines the oclumes to be masked and the format of masked data. You can create a new masking definition or use an existing definition for a masking operation. The Format Library<br>contains a collection of ready-to-use masking formats. |                     |                              |  |   |  |  |  |  |
| Search Database 🗘 'db04.oracle.com'   | 60                  |                              |  | (Import) Create)  |  |  |  |  |
| (View) (Edit) (Generate Script) (Schedule Job) (Dele  | te Actions Clone    | Database 🖨 🕝                 |  |   |  |  |  |  |
| Select Masking Definition 🛆   | Database            | Description                  | Columns Status                           | Most Recent Job Ended   |  |  |  |  |
| DETERMINISTIC MASKING EXAMPLE HR01  | db04.oracle.com     | Sample Deterministic Examp   | le <u>1</u> Masking Job Succeeded        | Jul 28, 2010 9:48:22 PM GMT+00:00                               |  |  |  |  |
| O DETERMINISTIC MASKING EXAMPLE HR02  | db04.oracie.com     | Simple Deterministic Example | e <u>1</u> Masking Job Succeeded         | Jul 28, 2010 9:45:51 PM GMT+00:00                               |  |  |  |  |

#### 44. Click on the database link db04.oracle.com.

| Datal<br>View (<br>Targets<br>Search | Databases     Vew O rande Load Map O search List     Page Refreshed Jul 28, 2010 9:49:20 PM UTC C       Targets Not Configured 1     Go Advanced       Search     Search |        |        |                          |                      |            |               |               |                 |                  |
|--------------------------------------|--|--------|--------|--------------------------|----------------------|------------|---------------|---------------|-----------------|------------------|
| Ren                                  | nove Configure   | Add    |        |                          |                      |            |               |               |                 |                  |
| Select                               | Name 🛆   | Status | Alerts | <b>Policy Violations</b> | Compliance Score (%) | Version    | Sessions: CPU | Sessions: I/O | Sessions: Other | Instance CPU (%) |
| ۲                                    | av.oracle.com  |        |        | 1 25 3                   | 99                   | 10.2.0.3.0 |               |               |                 |                  |
| 0                                    | db01.oracle.com  | 4      |        | <u>5 28 6</u>            | 98                   | 11.1.0.7.0 |               |               |                 |                  |
| 0                                    | db02.oracle.com  | 4      |        | <u>5 26 2</u>            | 98                   | 11.1.0.7.0 |               |               |                 |                  |
| 0                                    | db03.oracle.com  | 4      |        | 1 26 3                   | 99                   | 10.2.0.4.0 |               |               |                 |                  |
| 0                                    | db04.oracle.com  | Û      | 30     | 000                      | -                    | 11.2.0.1.0 | -             | - 🧹           | - 🧹             | -                |
| 0                                    | db06.oracle.com  | 4      |        | 000                      | -                    | 11.2.0.1.0 |               |               |                 |                  |
| 0                                    | emrep.oracle.com   | û      | 1 1    | <u>15 69 5</u>           | 92                   | 10.2.0.4.0 | <u>.01</u>    | <u>.01</u> 🛷  | Q 🛷             | <u>.44</u>       |

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45. Right click on the link, 'Schema' and choose the option, 'Open Link in New Tab'.

| Database Instance: db04.oracle.com   |                                    |                                |  |
|--------------------------------------|------------------------------------|--------------------------------|--|
|                                      |                                    |                                |  |
| Home Performance Availability Server | Schema Data Movement Software      | and Support                    |  |
|                                      | 🔛 🔂 Open Link in New <u>W</u> indo | W HILLING COLOR OF THE OUT     | Nieus Data Autometicalis (00 ana)          |
|                                      | 📫 Open Link in New Tab             | 53 JUI 26, 2010 9:02:56 PM GMT | Refresh View Data Automatically (60 Sec) - |
|                                      |                                    |                                |  |
| General                              | Host CPL Bookmark This Link        | Sessions                       | SQL Response Time                          |
| 4 Shutdown Black Out                 | 1.0 🕼 Save Lin <u>k</u> As         |                                | 1.0  |
|                                      | Send Link                          |                                |  |
| Status <u>Op</u>                     |                                    |                                | 0.5  |
| Op Since Jul 28, 2010 5:52:53 PM 01C | L Copy Link Location               |                                |  |
| Version 112010                       |                                    |                                | 0.0  |
| Host dissourity oracle com           | eropendes                          | Los d'an                       | Les d'un                                   |
| Host desecting oracle.com            | Loading                            | Loading                        | Loading                                    |
| Listener LISTENER1 dbsecurity.oracie | Load 0.00 Paging 0.00              | CPU Cores 2                    | SQL Response Time (%) Unavailable          |
| View All Properties                  |                                    |                                | Edit Reference Collection                  |
|                                      |                                    |                                |  |

46. In the newly opened tab, we will query the HR02 table. Click on the Tables link.

| Database    | atabase Instance: db04.oracle.com |              |               |        |                |                                     |                    |  |  |  |  |
|-------------|-----------------------------------|--------------|---------------|--------|----------------|-------------------------------------|--------------------|--|--|--|--|
| Home        | Performance                       | Availability | <u>Server</u> | Schema | Data Movement  | Software and Support                |                    |  |  |  |  |
| Databas     | Database Objects Pro              |              |               |        | Programs       |                                     | Materialized Views |  |  |  |  |
| Tables      |                                   |              |               | 1      | Packages       | skages Materialized Views           |                    |  |  |  |  |
| Indexes     |                                   |              |               | 1      | Package Bodies | ckage Bodies Materialized View Logs |                    |  |  |  |  |
| Views       |                                   |              |               | 1      | Procedures     |                                     | Refresh Groups     |  |  |  |  |
| Synonyms    |                                   |              |               | 1      | unctions       |                                     | Dimensions         |  |  |  |  |
| Sequence:   | 1                                 |              |               |        | Friggers       |                                     |                    |  |  |  |  |
| Database    | _inks                             |              |               | 5      | lava Classes   |                                     |                    |  |  |  |  |
| Directory C | <u>Dbjects</u>                    |              |               | 5      | lava Sources   |                                     |                    |  |  |  |  |
| Beorganiz   | e Objects                         |              |               |        |                |                                     |                    |  |  |  |  |

47. We will be querying the HR02 schema and the EMPLOYEES table. Click on the Go button.

| Tables           |                                    |  |                     |
|------------------|------------------------------------|--|---------------------|
|                  |                                    |  | Object Type Table : |
| Search           |                                    |  |                     |
| Select an object | ct type and optionally enter a sch | ma name and an object name to filter the data that is displayed in you | ur results set.     |
| Schema           | HR02                               | &  |                     |
| Object Name      | EMPLOYEES                          |  |                     |
|                  | Go                                 |  |                     |

48. Select the Action to View Data and click on the Go button.

| Edit      | View Delete With Optic | ons Actions View Data | \$ G0      |             |                                |
|-----------|------------------------|-----------------------|------------|-------------|--------------------------------|
| Select Sc | chema 🛆                | Table Name            | Tablespace | Partitioned | Rows Last Analyzed             |
| HF        | R02                    | EMPLOYEES             | EXAMPLE    | NO          | 107 Jan 8, 2010 8:34:36 AM UTC |

49. Click on the EMPLOYEE\_ID column to sort the data.

| View   | Data for Table   | e: HR02.EM   | PLOYEES   | :  |                         |                          |         |        | R              | Refine Query) | OK)    |
|--------|--|--|---|--|-------------------------|--------------------------|---------|--------|----------------|---------------|--------|
| Query  | SELECT 'EMPLO'<br>'HIRE_DATE', 'JC<br>'NATIONAL_ID', '<br>'COUNTRY_ID' F | YEE_ID', 'FIRS<br>DB_ID', 'SALAF<br>'STREET_ADD<br>'ROM 'HR02'.' | ST_NAME', 'L/<br>RY', 'COMMIS<br>RESS', 'POST<br>EMPLOYEES' | AST_NAME', 'EMAIL', 'PHONE_NUMBE<br>SION_PCT', 'MAINAGER_ID', 'DEPART<br>'AL_CODE', 'CITY', 'STATE_PROVINC | R',<br>MENT_ID',<br>E', |                          |         |        |                |               |        |
| Result |  | _  |   |  |                         |                          |         |        |                |               |        |
| 1      | EMPLOYEE_ID 🛆  | FIRST_NAME   | LAST_NAME   | EMAIL  | PHONE_NUMBER            | HIRE_DATE                | JOB_ID  | SALARY | COMMISSION_PCT | MANAGER_ID    | DEPART |
|        | 100  | Steven   | King  | Laurence.Seignier@CREEPER.COM  | 515.123.4567            | 1987-06-17<br>00:00:00.0 | AD_PRES | 24000  |                |               |        |
|        | 101  | Neena  | Kochhar   | Keir.Weaver@WHIMBREL.COM   | 515.123.4568            | 1989-09-21<br>00:00:00.0 | AD_VP   | 17000  |                | 100           |        |
|        | 102  | Lex  | De Haan   | Sally.Bogart@WILLET.COM  | 515.123.4569            | 1993-01-13<br>00:00:00.0 | AD_VP   | 17000  |                | 100           |        |
|        | 103  | Alexander  | Hunokd  | Ajay.Sen@TROGON.COM  | 590.423.4567            | 1990-01-03<br>00:00:00.0 | IT_PROG | 9000   |                | 102           |        |

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50. Compare the two tabs and the results of the masked tables, HR01 and HR02. You will notice the results of deterministic masking. The masked values for the EMAIL column are consistent between these two tables.

| EMPLOYEE_ID | FIRST_NAME | LAST_NAME | EMAIL                          |
|-------------|------------|-----------|--------------------------------|
| 100         | Steven     | King      | Alexander.Berenger@BECARD.COM  |
| 101         | Neena      | Kochhar   | Harrison.Sutherland@GODWIT.COM |
| 102         | Lex        | De Haan   | Rick.Lyon@MERGANSER.COM        |
| 103         | Alexander  | Hunold    | Hal.Stockwell@PHOEBE.COM       |
| 104         | Bruce      | Ernst     | Shelley.Peckinpah@GODWIT.COM   |
| 105         | David      | Austin    | Roy.Hulce@SISKIN.COM           |
| 106         | Valli      | Pataballa | Rosanne.Douglas@ANHINGA.COM    |
| 107         | Diana      | Lorentz   | Diane.Mason@TROGON.COM         |