

Kick Up Your Data Load And Data Extract Jobs A Notch!

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My Contact Info

Download the scripts for this presentation at :

<http://www.docubrowse.com/presentations>

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My Background

- Currently employed as a Database Administrator / Developer
- Certified in Oracle 8i and 9i
- Experience using 7, 8i, 9i, 10g release 1, RAC

10 years of IT Experience including...

- Database administration, design, development
- Java and PL/SQL development
- Internet / Intranet web site development
- LAN Administration

Session Goal

- To provide an introduction to external tables and directory objects, along with some simple, practical examples, so that you can begin to work with and investigate these new Oracle features.

Session Objectives

- Directory Object Overview
- External Table Overview
- Setting up for the Examples
- Example 1 - Using Directory Objects and External Tables in a Data Load Job
- Example 2 – Using Directory Objects and External Tables in a Data Extract Job

Directory Object Overview (1)

What is a Directory Object?

- Alias for an existing operating system directory
- Exists as object within the Oracle database
- Can be referred to in PL/SQL code

Directory Object Overview (2)

Why Use Them?

- Create new output paths without restarting the database
- Control access to output paths through database permissioning
- Dynamically create directory output paths within PL/SQL procedures (i.e. for dates, etc.)
- More.....

Directory Object Overview (3)

Requirements:

- “Create Any Directory” privilege
- Existence of related operating system directory
- OS Permissioning of operating system directory for Oracle database processes (i.e. oracle user on unix/linux)
- Granting of privileges to database user who will run PL/SQL referring to the directory object

Directory Object Overview (4)

Creation and Permissioning:

```
mydba > create or replace directory  
DIR_AOTC_FALL_2005_MY_OUTPUT as  
'C:\aotc_fall_2005\my_output';
```

```
mydba > grant read, write on directory  
DIR_AOTC_FALL_2005_MY_OUTPUT to MYUSER;
```

Directory Object Overview (5)

Use Example:

```
myuser > select * from dba_directories;
```

```
myuser > @C:\aotc_fall_2005\scripts\create_pkg_test.sql
```

```
myuser > exec
```

```
    pkg_examples.write_to_file_test('DIR_AOTC_FALL_20  
05_MY_OUTPUT', 'test_file.txt')
```

External Table Overview (1)

What is an External Table?

- A type of Oracle database table
- Points to an operating system file
- DDL refers to directory object
- Can INSERT INTO....SELECT FROMMERGE
- Can perform multi table UPDATES
- Can JOIN with regular database tables
- 9i – Read only, table can only be queried
- 10g – Can also extract to, using ORACLE_DATAPUMP type

External Table Overview (2)

Why Use Them?

- Can use any SQL function on them to selectively load/insert data into a database table
- Can update a database table from them
- Can incorporate data loads or updates from them using PL/SQL procedures
- Can unload/extract data to them to reload into another oracle database (10g only)

External Table Overview (3)

Requirements:

- Existence of related operating system file
- OS Permissioning of operating system directory and file for Oracle database processes (i.e. oracle user on unix/linux)
- Granting of privileges to database user who will run PL/SQL referring to the external table

External Table Overview (4)

Creation :

```
myuser > CREATE TABLE EXT_TEST_FILE_TABLE
(
  LASTNAME VARCHAR2 (50) ,
  FIRSTNAME VARCHAR2 (50)
)
ORGANIZATION EXTERNAL
( TYPE ORACLE_LOADER
.....
```

External Table Overview (5)

Use Example:

```
myuser > select * from ext_test_file_table;
```

```
myuser > select substr(firstname, 1, 1) || lastname from  
ext_test_file_table;
```

```
myuser > select firstname || ' ' || lastname from ext_test_file_table;
```

Setting Up for the Examples.

- ◆ Create the example user
mydba > @create_user.sql
- ◆ Create the example table
myuser > @create_table.sql
- ◆ Create the FTP PL/SQL package
myuser > @create_pkg ftp.sql
- ◆ Create the EMAIL PL/SQL package
myuser > @create_pkg_email.sql
- ◆ Create the EXAMPLE PL/SQL package
myuser > @create_pkg_examples.sql

Example 1 → Step 1.) Create a New Directory.

```
mydba> create or replace directory  
DIR_AOTC_FALL_2005_EXAMPLE1 as  
'C:\aotc_fall_2005\example1;
```

```
mydba > grant read, write on directory  
DIR_AOTC_FALL_2005_EXAMPLE1 to MYUSER;
```

Example 1 → Step 2.) Create External Table.

```
myuser> CREATE TABLE EXT_EMPLOYEE_FILE
(  LASTNAME VARCHAR2(32),
   FIRSTNAME VARCHAR2(32)
)
ORGANIZATION EXTERNAL
( TYPE ORACLE_LOADER
  DEFAULT DIRECTORY
  "DIR_AOTC_FALL_2005_EXAMPLE1"
  ACCESS PARAMETERS.....
```

Example 1 → Step 3.) Get Source File

PKG_EXAMPLES.EMPLOYEE_DATA_LOAD_AND_FTP

```
PKG_FTP.get(p_conn => l_ftp_connection,  
           p_from_file => l_filename_source,  
           p_to_dir => l_directory_example1,  
           p_to_file => l_filename_dest);
```

Example 1 → Step 4.) Load Data

```
PKG_EXAMPLES.EMPLOYEE_DATA_LOAD_AND_FTP
```

```
MERGE INTO employees e
  USING external_table e_ext
  ON (E.EMPLOYEEID=E_EXT.EMPLOYEEID)
  WHEN MATCHED THEN UPDATE
    e.firstname=e_ext.firstname,
    e.lastname=e_ext.lastname,
    e.fullname=e_ext.firstname || ' ' || e_ext.lastname,
    e.phone=e_ext.phone,
    e.emailaddress=e_ext.emailaddress
  WHEN NOT MATCHED THEN
  INSERT .....
```

Example 1 → Step 5.) Send Email Notification

PKG_EXAMPLES.EMPLOYEE_DATA_LOAD_AND_FTP

PKG_EMAIL.send

```
( p_smtp_host => l_smtp_host,  
  p_sender_email => l_from_email,  
  p_from => l_from_email,  
  p_to => pkg_email.array(l_to_email),  
  p_cc => pkg_email.array(l_cc_email, l_cc_email2),  
  p_bcc => pkg_email.array(l_to_email),  
  p_subject => l_subject_msg,  
  p_body => l_body_msg || chr(10) || chr(10) || l_completion_message);
```

Example 1 → Step 6.) Run or Schedule PL/SQL Procedure

```
exec PKG_EXAMPLES.EMPLOYEE_DATA_LOAD_AND_FTP
```

Because everything is now in PL/SQL, you can :

- Schedule it to run through DBMS_JOB
- Schedule it to run through DBMS_SCHEDULER
- Schedule it to run through Oracle Management Server

Or run it manually.....

Example 2 (10g) → Step 1.) Create a New Directory.

PKG_EXAMPLES.EMPLOYEE_DATA_EXTRACT_AND_FTP

```
mydba> create or replace directory  
DIR_AOTC_FALL_2005_EXAMPLE2 as  
'C:\aotc_fall_2005\example2;
```

```
mydba > grant read, write on directory  
DIR_AOTC_FALL_2005_EXAMPLE2 to MYUSER;
```

Example 2 (10g) → Step 2.) Create External Table - Extract Data

PKG_EXAMPLES.EMPLOYEE_DATA_EXTRACT_AND_FTP

```
myuser> CREATE TABLE EMPLOYEE_EXTRACT
  ORGANIZATION EXTERNAL
  ( TYPE ORACLE_DATAPUMP
    DEFAULT DIRECTORY DIR_AOTC_FALL_2005_EXAMPLE2
    LOCATION( 'EMPLOYEE_EXTRACT.DAT' )
  )
AS
SELECT * FROM EMPLOYEES
/
```

Example 2 (10g) → Step 3.) FTP Data Extract File

```
PKG_EXAMPLES.EMPLOYEE_DATA_EXTRACT_AND_FTP
```

```
PKG_FTP.put(p_conn => l_ftp_connection,  
           p_from_dir => l_directory_example2,  
           p_from_file => l_filename_source,  
           p_to_file => l_filename_dest);
```

Example 2 (10g) → Step 4.) Send Email Notification

PKG_EXAMPLES.EMPLOYEE_DATA_EXTRACT_AND_FTP

PKG_EMAIL.send

```
( p_smtp_host => l_smtp_host,  
  p_sender_email => l_from_email,  
  p_from => l_from_email,  
  p_to => pkg_email.array(l_to_email),  
  p_cc => pkg_email.array(l_cc_email, l_cc_email2),  
  p_bcc => pkg_email.array(l_to_email),  
  p_subject => l_subject_msg,  
  p_body => l_body_msg || chr(10) || chr(10) || l_completion_message);
```

Example 2 (10g)→ Step 5.) Run or Schedule PL/SQL Procedure

```
exec PKG_EXAMPLES.EMPLOYEE_DATA_EXTRACT_AND_FTP
```

Because everything is now in PL/SQL, you can :

- Schedule it to run through DBMS_JOB
- Schedule it to run through DBMS_SCHEDULER
- Schedule it to run through Oracle Management Server

Or run it manually.....

Miscellaneous Notes

- **Be Careful With Directory Permissions** – Be frugal when granting “create any directory” permissions to users. If they create it, they can write to it through the database.
- **Case Sensitivity** – Be aware of OS directory and file name case sensitivity when creating directory objects and external tables in Oracle.
- **Do The Research** – Your environment is not going to be exactly the same as any one else's. Read the Oracle DOCS and Chapter 15 of Tom Kyte's new book (and the rest also!).

Acknowledgements / More Information

Oracle Docs / Manuals:

- Oracle Database SQL Reference Manual, 9i, 10g, Oracle Corporation
- Oracle Database Concepts Manual, 9i, 10g, Oracle Corporation
- Oracle Utilities Guide 9i, 10g, Oracle Corporation

Other Books:

- Expert Oracle Database Architecture, Tom Kyte

Web Sites:

- <http://asktom.oracle.com>
- <http://www.oracle-base.com>
- <http://otn.oracle.com>

Scripts / Contact Info

Use the scripts at your own risk and test them fully in your own test environment before using them in a production database.

Please email me if you find any errors in the scripts or have any questions.

Download the scripts at :

<http://www.docubrowse.com/presentations>

Email me at:

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Questions?

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The End.

**Thanks for Coming and please complete the
evaluation!**