

3 Oracle Data Dictionary

The ORACLE data dictionary is one of the most important components of the ORACLE DBMS. It contains all information about the structures and objects of the database such as tables, columns, users, data files etc. The data stored in the data dictionary are also often called *metadata*. Although it is usually the domain of database administrators (DBAs), the data dictionary is a valuable source of information for end users and developers. The data dictionary consists of two levels: the internal level contains all base tables that are used by the various DBMS software components and they are normally not accessible by end users. The external level provides numerous views on these base tables to access information about objects and structures at different levels of detail.

3.1 Data Dictionary Tables

An installation of an ORACLE database always includes the creation of three standard ORACLE users:

- **SYS**: This is the owner of all data dictionary tables and views. This user has the highest privileges to manage objects and structures of an ORACLE database such as creating new users.
- **SYSTEM**: is the owner of tables used by different tools such SQL*Forms, SQL*Reports etc. This user has less privileges than **SYS**.
- **PUBLIC**: This is a “dummy” user in an ORACLE database. All privileges assigned to this user are automatically assigned to all users known in the database.

The tables and views provided by the data dictionary contain information about

- users and their privileges,
- tables, table columns and their data types, integrity constraints, indexes,
- statistics about tables and indexes used by the optimizer,
- privileges granted on database objects,
- storage structures of the database.

The SQL command

```
select * from DICT[IONARY];
```

lists all tables and views of the data dictionary that are accessible to the user. The selected information includes the name and a short description of each table and view. Before issuing this query, check the column definitions of DICT[IONARY] using **desc** DICT[IONARY] and set the appropriate values for **column** using the **format** command.

The query

```
select * from TAB;
```

retrieves the names of all tables owned by the user who issues this command. The query

```
select * from COL;
```

returns all information about the columns of one's own tables.

Each SQL query requires various internal accesses to the tables and views of the data dictionary. Since the data dictionary itself consists of tables, ORACLE has to generate numerous SQL statements to check whether the SQL command issued by a user is correct and can be executed.

Example: The SQL query

```
select * from EMP
where SAL > 2000;
```

requires a verification whether (1) the table **EMP** exists, (2) the user has the privilege to access this table, (3) the column **SAL** is defined for this table etc.

3.2 Data Dictionary Views

The external level of the data dictionary provides users a front end to access information relevant to the users. This level provides numerous views (in ORACLE7 approximately 540) that represent (a portion of the) data from the base tables in a readable and understandable manner. These views can be used in SQL queries just like normal tables.

The views provided by the data dictionary are divided into three groups: **USER**, **ALL**, and **DBA**. The group name builds the prefix for each view name. For some views, there are associated synonyms as given in brackets below.

- **USER.:** Tuples in the **USER** views contain information about objects owned by the account performing the SQL query (current user)

USER_TABLES	all tables with their name, number of columns, storage information, statistical information etc. (TABS)
USER_CATALOG	tables, views, and synonyms (CAT)
USER_COL_COMMENTS	comments on columns
USER_CONSTRAINTS	constraint definitions for tables
USER_INDEXES	all information about indexes created for tables (IND)
USER_OBJECTS	all database objects owned by the user (OBJ)
USER_TAB_COLUMNS	columns of the tables and views owned by the user (COLS)
USER_TAB_COMMENTS	comments on tables and views
USER_TRIGGERS	triggers defined by the user
USER_USERS	information about the current user
USER_VIEWS	views defined by the user

- **ALL.:** Rows in the **ALL** views include rows of the **USER** views and all information about objects that are accessible to the current user. The structure of these views is analogous to the structure of the **USER** views.

ALL_CATALOG	owner, name and type of all accessible tables, views, and synonyms
ALL_TABLES	owner and name of all accessible tables
ALL_OBJECTS	owner, type, and name of accessible database objects
ALL_TRIGGERS	...
ALL_USERS	...
ALL_VIEWS	...

- **DBA:** The DBA views encompass information about all database objects, regardless of the owner. Only users with DBA privileges can access these views.

DBA_TABLES	tables of all users in the database
DBA_CATALOG	tables, views, and synonyms defined in the database
DBA_OBJECTS	object of all users
DBA_DATA_FILES	information about data files
DBA_USERS	information about all users known in the database