

## Exploring DICTIONARY Tables and SASHELP Views

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### ABSTRACT

SAS® users can quickly and conveniently obtain useful information about their SAS session with a number of read-only SAS data views called DICTIONARY tables or SASHELP views. At any time during a SAS session, information about currently defined system options, libnames, table names, column names and attributes, formats, indexes, and more can be accessed and captured. This paper explores the purpose of DICTIONARY tables and views, how they are accessed, and what information is available to SAS users. Attendees will learn how these important tables and views can be accessed and applied using real-world scenarios.

### INTRODUCTION

The SAS System generates and maintains valuable information at run time about SAS libraries, data sets, catalogs, indexes, macros, system options, titles, and views in a collection of read-only tables called dictionary tables. Although called tables, Dictionary tables are not real tables. Information is automatically generated at runtime and each table's contents are made available once a SAS session is started.

Dictionary tables and SASHELP views contents permit a SAS session's activities to be easily accessed and monitored. This becomes particularly useful in the design and construction of software applications since the information can be queried and the results acted upon in a specific task such as in the allocation of filerefs or librefs.

### TABLES USED IN EXAMPLES

The data used in all the examples in this paper consists of a selection of movies that I've viewed over the years, along with actors. The Movies table consists of six columns: title, length, category, year, studio, and rating. Title, category, studio, and rating are defined as character columns with length and year being defined as numeric columns. The data stored in the Movies table is illustrated below.

#### MOVIES Table

	Title	Length	Category	Year	Studio	Rating
1	Brave Heart	177	Action Adventure	1995	Paramount Pictures	R
2	Casablanca	103	Drama	1942	MGM / UA	PG
3	Christmas Vacation	97	Comedy	1989	Warner Brothers	PG-13
4	Coming to America	116	Comedy	1988	Paramount Pictures	R
5	Dracula	130	Horror	1993	Columbia TriStar	R
6	Dressed to Kill	105	Drama Mysteries	1980	Filmways Pictures	R
7	Forrest Gump	142	Drama	1994	Paramount Pictures	PG-13
8	Ghost	127	Drama Romance	1990	Paramount Pictures	PG-13
9	Jaws	125	Action Adventure	1975	Universal Studios	PG
10	Jurassic Park	127	Action	1993	Universal Pictures	PG-13
11	Lethal Weapon	110	Action Cops & Robber	1987	Warner Brothers	R
12	Michael	106	Drama	1997	Warner Brothers	PG-13
13	National Lampoon's Vacation	98	Comedy	1983	Warner Brothers	PG-13
14	Poltergeist	115	Horror	1982	MGM / UA	PG
15	Rocky	120	Action Adventure	1976	MGM / UA	PG
16	Scarface	170	Action Cops & Robber	1983	Universal Studios	R
17	Silence of the Lambs	118	Drama Suspense	1991	Orion	R
18	Star Wars	124	Action Sci-Fi	1977	Lucas Film Ltd	PG
19	The Hunt for Red October	135	Action Adventure	1989	Paramount Pictures	PG
20	The Terminator	108	Action Sci-Fi	1984	Live Entertainment	R
21	The Wizard of Oz	101	Adventure	1939	MGM / UA	G
22	Titanic	194	Drama Romance	1997	Paramount Pictures	PG-13

The data stored in the ACTORS table is illustrated below.

## **ACTORS Table**

	Title	Actor_Leading	Actor_Supporting
1	Brave Heart	Mel Gibson	Sophie Marceau
2	Christmas Vacation	Chevy Chase	Beverly D'Angelo
3	Coming to America	Eddie Murphy	Arsenio Hall
4	Forrest Gump	Tom Hanks	Sally Field
5	Ghost	Patrick Swayze	Demi Moore
6	Lethal Weapon	Mel Gibson	Danny Glover
7	Michael	John Travolta	Andie MacDowell
8	National Lampoon's Vacation	Chevy Chase	Beverly D'Angelo
9	Rocky	Sylvester Stallone	Talia Shire
10	Silence of the Lambs	Anthony Hopkins	Jodie Foster
11	The Hunt for Red October	Sean Connery	Alec Baldwin
12	The Terminator	Arnold Schwarzenegger	Michael Biehn
13	Titanic	Leonardo DiCaprio	Kate Winslet

## **EXPLORING DICTIONARY TABLES AND SASHELP VIEWS**

SAS users can quickly and conveniently obtain useful information about their SAS session with a number of read-only SAS data views called DICTIONARY tables. At any time during a SAS session, DICTIONARY tables can be used to capture information related to currently defined libnames, table names, column names and attributes, formats, and much more. DICTIONARY tables are accessed using the libref DICTIONARY in the FROM clause of a PROC SQL SELECT statement. SASHELP views can be accessed in the DATA and procedure steps. The name of each DICTIONARY table and SASHELP view is presented below.

### ***DICTIONARY Tables and SASHELP Views***

<b>DICTIONARY Table</b>	<b>SASHELP View</b>	<b>Purpose</b>
<b>CATALOGS</b>	<b>VCATALG</b>	Provides information about SAS catalogs.
<b>CHECK_CONSTRAINTS</b>	<b>VCHKCON</b>	Provides check constraints information.
<b>COLUMNS</b>	<b>VCOLUMN</b>	Provides information about column in tables.
<b>CONSTRAINT_COLUMN_USAGE</b>	<b>VCNCOLU</b>	Provides column integrity constraints information.
<b>CONSTRAINT_TABLE_USAGE</b>	<b>VCNTABU</b>	Provides information related to tables with integrity constraints defined.
<b>DICTIONARIES</b>	<b>VDCTNRY</b>	Provides information about all the DICTIONARY tables.
<b>ENGINES</b>	<b>VENGINE</b>	Provides information about known SAS engines available to the session.
<b>EXTFILES</b>	<b>VEXTFL</b>	Provides information related to external files.
<b>FORMATS</b>	<b>VFORMAT</b>	Provides information related to defined formats and informats.
<b>GOPTIONS</b>	<b>VGOPT</b>	Provides information about currently defined SAS/GRAPH software graphics options.
<b>INDEXES</b>	<b>VINDEX</b>	Provides information related to defined indexes.
<b>LIBNAMES</b>	<b>VLIBNAM</b>	Provides information related to defined SAS data libraries.
<b>MACROS</b>	<b>VMACRO</b>	Provides information related to any defined macros.
<b>MEMBERS</b>	<b>VMEMBER</b>	Provides information related to objects currently defined in SAS data libraries.

<b>OPTIONS</b>	<b>VOPTION</b>	Provides information related to SAS system options.
<b>REFERENTIAL_CONSTRAINTS</b>	<b>VREFCON</b>	Provides information related to tables with referential constraints.
<b>STYLES</b>	<b>VSTYLE</b>	Provides information related to select ODS styles.
<b>TABLE_CONSTRAINTS</b>	<b>VTABCON</b>	Provides information related to tables containing integrity constraints.
<b>TABLES</b>	<b>VTABLE</b>	Provides information related to currently defined tables.
<b>TITLES</b>	<b>VTITLE</b>	Provides information related to currently defined titles and footnotes.
<b>VIEWS</b>	<b>VVIEW</b>	Provides information related to currently defined data views.

## DISPLAYING DICTIONARY TABLE DEFINITIONS

A dictionary table's definition can be displayed by specifying a DESCRIBE TABLE statement. The results of the statements and clauses used to create each dictionary table can be displayed on the SAS Log. For example, a DESCRIBE TABLE statement is illustrated below to display the CREATE TABLE statement used in building the OPTIONS dictionary table containing current SAS System option settings.

### PROC SQL Code

```
PROC SQL;
  DESCRIBE TABLE
    DICTIONARY.OPTIONS;
QUIT;
```

### SAS Log Results

```
create table DICTIONARY.OPTIONS
(
  optname char(32) label='Option Name',
  setting char(1024) label='Option Setting',
  optdesc char(160) label='Option Description',
  level char(8) label='Option Location'
);
```

**Note:** The information contained in dictionary tables is also available to DATA and PROC steps outside the SQL procedure. Referred to as SASHELP views, each view is prefaced with the letter "V" and may be shortened with abbreviated names. SASHELP views can be accessed by referencing the view by its name in the SASHELP library. Please refer to the SAS Procedures Guide for further details on accessing and using dictionary views in the SASHELP library.

## EXPLORING THE CONTENTS OF THE DICTIONARIES TABLE AND VDCTNRY SASHELP VIEW

SAS users can easily identify any new Dictionary table release by accessing the read-only DICTIONARIES Dictionary table or VDCTNRY SASHELP view. The contents of the DICTIONARIES Dictionary table and VDCTNRY SASHELP view reveals the names of supported tables and views. The following PROC SQL query specifies the UNIQUE keyword to generate a listing of existing Dictionary tables.

### PROC SQL Code:

```
PROC SQL;  
  SELECT UNIQUE MEMNAME  
  FROM DICTIONARY.DICTIONARIES;  
QUIT;
```

### Results:

Member Name
CATALOGS
CHECK_CONSTRAINTS
COLUMNS
CONSTRAINT_COLUMN_USAGE
CONSTRAINT_TABLE_USAGE
DICTIONARIES
ENGINES
EXTFILES
FORMATS
GOPTIONS
INDEXES

Member Name
LIBNAMES
MACROS
MEMBERS
OPTIONS
REFERENTIAL_CONSTRAINTS
REMEMBER
STYLES
TABLES
TABLE_CONSTRAINTS
TITLES
VIEWS

The corresponding SASHELP views are listed below.

### Results:

Member Name
VCATALOG
VCHKCON
VCOLUMN
VCNCOLU
VCNTABU
VDCTNRY
VENGINE
VEXTFL
VFORMAT
VGOPT
VINDEX

Member Name
VLIBNAM
VMACRO
VMEMBER
VOPTION
VREFCON
VREMEMB
VSTYLE
VTABCON
VTABLE
VTITLE
VVIEW

### Dictionary.COLUMNS

Retrieving information about the columns in one or more data sets or tables is easy with the COLUMNS dictionary table. Similar to the results of the CONTENTS procedure, users are able to capture column-level information including column name, type, length, position, label, format, informat, and indexes, as well as produce cross-reference listings containing the location of columns in a SAS library. For example, the following code requests a cross-reference listing of the tables containing the TITLE column in the WORK library.

**Note:** Care should be used when specifying multiple functions on the WHERE clause since the SQL Optimizer is unable to optimize the query resulting in all allocated SAS session librefs being searched. This can cause the query to run much longer than expected.

### PROC SQL Code

```
PROC SQL;
  SELECT *
    FROM DICTIONARY.COLUMNS
      WHERE UPCASE(LIBNAME) = "WORK" AND
          UPCASE(NAME) = "TITLE" ;
QUIT;
```

### Results

Library Name	Member Name	Member Type	Column Name	Column Type	Column Length	Column Position	Column Number in Table	Column Label	Column Format	Column Informat	Column Index Type
	<b>Order in Key Sequence</b>	<b>Extended Type</b>	<b>Not NULL?</b>	<b>Precision</b>	<b>Scale</b>	<b>Transcoded?</b>					
WORK	ACTORS	DATA	Title	char	30	0	1				
	0	char									
		no				yes					
WORK	MOVIES	DATA	Title	char	30	7	1				SIMPLE
	0	char									
		no				yes					

### Dictionary.TABLES

When users need more information about SAS files consider using the TABLES dictionary table. The TABLES dictionary table provides detailed information about the library name, member name and type, date created and last modified, number of observations, observation length, number of variables, password protection, compression, encryption, number of pages, reuse space, buffer size, number of deleted observations, type of indexes, and requirements vector. For example, to obtain a detailed list of files in the WORK library, a PROC SQL SELECT query can be constructed as follows.

**Note:** Because the TABLE Dictionary table produces a considerable amount of information, users should consider specifying a WHERE clause when accessing this table.

### PROC SQL Code

```
PROC SQL;
  SELECT *
    FROM DICTIONARY.TABLES
      WHERE UPCASE(LIBNAME) = "WORK" ;
QUIT;
```

## Results

Library Name	Member Name	Member Type	DBMS Member Type	Dataset Label	Dataset Type	Date Created	Date Modified	Number of Physical Observations		
Observation Length	Number of Variables	Type of Password Protection	Compression Routine	Encryption	Number of Pages	Size of File	Percent Compression	Reuse Space	Bufsize	
Number of Deleted Observations	Number of Logical Observations	Longest variable name	Longest label	Maximum number of generations	Generation number	Dataset Attributes	Type of Indexes	Data Representation		
Name of Collating Sequence	Sorting Type	Charset Sorted By	Requirements Vector				Data Representation Name	Data Encoding	Audit Trail Active?	
Audit Before Image?	Audit Admin Image?	Audit Error Image?	Audit Data Image?							
WORK	ACTORS	DATA			DATA	09AUG04:15:40:18	09AUG04:15:40:18	13		
70	3	---	NO	NO	1	16384	0	no	8192	
0	13	16	0	0	.	ON		NATIVE		
			181F101122220032220102320432012222003E0000100301				WINDOWS_32	wlatin1 Western (Windows)	no	
no	no	no	no							
WORK	MOVIES	DATA			DATA	09AUG04:15:40:18	09AUG04:15:40:18	22		
88	6	---	NO	NO	2	24576	0	no	8192	
0	22	8	0	0	.	ON	SIMPLE	NATIVE		
			181F101122220032220102320432012222003E0000100301				WINDOWS_32	wlatin1 Western (Windows)	no	
no	no	no	no							

## CONCLUSION

The SAS System read-only Dictionary tables and SASHELP views provide valuable information about SAS libraries, data sets, columns and attributes, catalogs, indexes, macros, system options, titles, views, and much more. Users are encouraged to research these powerful providers of information in the SAS System.

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