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 learn how these important tables and views can be accessed and applied using real-world scenarios.

Introduction

The SAS System collects and populates valuable information ("metadata") about SAS libraries, data sets (tables), catalogs, indexes, macros, system options, titles, views and a collection of other read-only tables called dictionary tables. Dictionary tables serve a special purpose by providing system-related information about the current SAS session's SAS databases and applications. When a query is requested against a Dictionary table, SAS automatically launches a discovery process at runtime to collect information pertinent to that table. This information is made available anytime after 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 Schwarzenegge	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 system tables called DICTIONARY tables. At any time during a SAS session, DICTIONARY tables can be accessed using the libref DICTIONARY in the FROM clause of a PROC SQL SELECT statement to capture information related to currently defined libnames, table names, column names and attributes, formats, and much more. SASHELP views can be accessed using any of your favorite procedures or in the DATA step.

SAS 9.1 software supported 22 Dictionary tables and SASHELP views, SAS 9.2 supported 29 Dictionary tables and SASHELP views, SAS 9.3 supports 30 DICTIONARY tables and SASHELP views, as illustrated below.

DICTIONARY Tables and SASHELP Views

DICTIONARY Table	SASHELP View	Purpose
CATALOGS	**VCATALG**	Provides information about SAS catalogs.
CHECK_CONSTRAINTS	**VCHKCON**	Provides check constraints information.
COLUMNS	**VCOLUMN**	Provides information about column in tables.
CONSTRAINT_COLUMN_USAGE	**VCNCOLU**	Provides column integrity constraints information.
CONSTRAINT_TABLE_USAGE	**VCNTABU**	Provides information related to tables with integrity constraints defined.
DATAITEMS	**VDATAIT**	Provides information about known data items.
DESTINATIONS	**VDEST**	Provides information about known ODS destinations.
DICTIONARIES	**VDCTNRY**	Provides information about all the DICTIONARY tables.
ENGINES	**VENGINE**	Provides information about known SAS engines available to the session.
EXTFILES	**VEXTFL**	Provides information related to external files.
FILTERS	**VFILTER**	Provides information about known filters.

FORMATS	**VFORMAT**	Provides information related to defined formats and informats.
FUNCTIONS	**VFUNC**	Provides information about all known functions.
GOPTIONS	**VGOPT**	Provides information about currently defined SAS/GRAPH software graphics options.
INDEXES	**VINDEX**	Provides information related to defined indexes.
INFOMAPS	**VINFOMP**	Provides information about all known information maps.
LIBNAMES	**VLIBNAM**	Provides information related to defined SAS data libraries.
MACROS	**VMACRO**	Provides information related to any defined macros.
MEMBERS	**VMEMBER**	Provides information related to objects currently defined in SAS data libraries.
OPTIONS	**VOPTION**	Provides information related to SAS system options.
PROMPTS	**VPROMPT**	Provides information about all known SAS/GRAPH prompts.
PROMPTSXML	**VPRMXML**	Provides information about all known XML prompts.
REFERENTIAL_CONSTRAINTS	**VREFCON**	Provides information related to tables with referential constraints.
REMEMBER	**VREMEMB**	Provides information about all known remembered text.
STYLES	**VSTYLE**	Provides information related to select ODS styles.
TABLES	**VTABLE**	Provides information related to currently defined tables.
TABLE_CONSTRAINTS	**VTABCON**	Provides information related to tables containing integrity constraints.
TITLES	**VTITLE**	Provides information related to currently defined titles and footnotes.
VIEWS	**VVIEW**	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.

The DICTIONARIES Table and VDCTNRY SASHELP View

SAS users can 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 uses the UNIQUE keyword to generate a listing of existing Dictionary tables.

PROC SQL Code:

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

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
Order in Key Sequence	Extended Type	Not NULL?	Precision	Scale	Transcoded?						
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
WORK	ACTORS	DATA			DATA	09AUG04:15:40:18	09AUG04:15:40:18	13
WORK	MOVIES	DATA			DATA	09AUG04:15:40:18	09AUG04:15:40:18	22

Observation Length	Number of Variables	Type of Password Protection	Compression Routine	Encryption	Number of Pages	Size of File	Percent Compression	Reuse Space	Bufsize
70	3	---	NO	NO	1	16384	0	no	8192
88	6	---	NO	NO	2	24576	0	no	8192

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
0	13	16	0	0	.	ON		NATIVE
0	22	8	0	0	.	ON	SIMPLE	NATIVE

Name of Collating Sequence	Sorting Type	Charset Sorted By	Requirements Vector	Data Representation Name	Data Encoding	Audit Trail Active?
			181F10112222003222010232043201222003E00001003 01	WINDOWS_32	wlatin1 Western (Windows)	no
			181F10112222003222010232043201222003E00001003 01	WINDOWS_32	wlatin1 Western (Windows)	no

Audit Before Image?	Audit Admin Image?	Audit Error Image?	Audit Data Image?
no	no	no	no
no	no	no	no

Conclusion

The SAS System read-only Dictionary tables and corresponding 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 resources of information to better understand information about data, for the creation of system documentation and performance tuning, as well as other important application areas.

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Trademark Citations

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