

## Accessing City-County Data Book via DBASE III: Census CD-ROMs from the Ground Up

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The Bureau of the Census has published the 1988 City-County Data Book data files on a CD-ROM disk. Physically the data are organized as DBASE-III database files and the Bureau has supplied a computer program to display profiles of particular areas. However, accessing the data for analysis purposes (such as finding the ethnicity of American counties) can only be done by directly using DBASE-III, and doing so is a multi-step process. This paper describes how to use DBASE-III directly on CCDB88 to select subsets of data for statistical analysis, and compares and contrasts the CCDB88 structure with the 1982 Census of Agriculture files on Test Disk 2. Some suggestions are made for how the Bureau might organize CD-ROM data and access software to better facilitate individual access and prepare for the 1990 Census.

# Accessing City-County Data Book with DBASE III

## 1. Introduction

In the 1990s the Bureau of the Census will utilize the CD-ROM as a major publishing medium for current and future census data. This process has been underway for several years and the Bureau has been through several iterations of test disks before settling on a de-facto standard for distribution file formats of the DBASE-III database system by Ashton-Tate Corporation. While some measure of standardization is imposed by this decision by the Bureau, other standards and capabilities need to be added for the convenience of public data users of census data. It is the purpose of this paper to discuss the kinds of tasks which might be commonplace by data users and the effort required to accomplish them, as well as to draw some conclusions as to the structure the Bureau might impose to ease the burden of accessing this data.

## 2. What is CD-ROM?

CD-ROM is a new data storage medium based on audio compact disk technology. Each cd-rom disk holds about 650 megabytes of data (about the equivalent of 4 computer magnetic tapes as we know them on the IBM mainframe). Since the production process is identical to that of compact disks, the cost of production is about the same (less than \$5 per disk).

CD-ROM can be conceived of as an extremely large and slow disk that you can't write on. It operates like a cross between a hard disk (because it's so big) and a floppy (because the disks are removable). On the IBM-AT machine in our archive, we have attached a CD-ROM drive from Denon Corp, and designated it to be drive F:

Thus if we have the City-County Data Book disk inserted in the drive we can do a directory command to see what files are on the drive:

Directory listing of database files on CCDB CD-ROM	D:\FRED> dir f:*.dbf/w
	Volume in drive F is CCDB_1988 Directory of F:\
	CIF01 DBF CIF01DCT DBF CIF02 DBF CIF02DCT DBF CIF03 DBF
	CIF03DCT DBF CIF04 DBF CIF04DCT DBF CIF05 DBF CIF05DCT DBF
	CIF06 DBF CIF06DCT DBF CIF07 DBF CIF07DCT DBF CIF08 DBF
	CIF08DCT DBF COF01 DBF COF01DCT DBF COF02 DBF COF02DCT DBF
	COF03 DBF COF03DCT DBF COF04 DBF COF04DCT DBF COF05 DBF
	COF05DCT DBF COF06 DBF COF06DCT DBF COF07 DBF COF07DCT DBF
	COF08 DBF COF08DCT DBF COF09 DBF COF09DCT DBF COF10 DBF
	COF10DCT DBF COF11 DBF COF11DCT DBF COF12 DBF COF12DCT DBF
	COF13 DBF COF13DCT DBF COF14 DBF COF14DCT DBF COF15 DBF
	COF15DCT DBF COF16 DBF COF16DCT DBF COF17 DBF COF17DCT DBF
	COF18 DBF COF18DCT DBF DCT_COU DBF DCT_CTY DBF DCT_PLC DBF
	DCT_STA DBF PLF01 DBF PLF01DCT DBF STF01 DBF STF01DCT DBF
	STF02 DBF STF02DCT DBF STF03 DBF STF03DCT DBF STF04 DBF
	STF04DCT DBF STF05 DBF STF05DCT DBF STF06 DBF STF06DCT DBF
	STF07 DBF STF07DCT DBF STF08 DBF STF08DCT DBF STF09 DBF
	STF09DCT DBF STF10 DBF STF10DCT DBF STF11 DBF STF11DCT DBF
	STF12 DBF STF12DCT DBF STF13 DBF STF13DCT DBF
	84 File(s) 0 bytes free
	D:FRED>

### 3. What data is available?

We currently have data from the Census Bureau, and will soon obtain a great deal more. The following data files are on hand:

Disk	File	Geography
TEST1	1980 Census, STF3	zipcode
AHS85	1985 American Housing Survey, National Core	nat/state
TEST2	1982 Census of Agriculture 1982 Census of Retail Trade	state/county zipcode
CCDB	1988 City-County Data Book	state/county/ city/place

TABLE 1 : CD-ROM Databases at UC DATA

### 4. Accessing CD-ROM data: City-County Data Book

The Census Bureau has supplied some access software (in the form of canned profiles which can be applied to generate reports for particular areas), all of which is located in the CDROM subdirectory on drive C in the archive. One of these is the CCDB profile program, which can be accessed as follows:

Census Bureau CD-ROM access software	C:\ cd cdrom		
	C:\CDROM> dir		
	Volume in drive C: is CDROM1-130686		
	Directory of C:\CDROM		
	AG82	<DIR>	7-12-88 9:34a
	RETAIL	<DIR>	7-12-88 9:35a
	ZIPS	<DIR>	8-02-89 8:56a
	README	1 666	8-08-88 10:41a
	README	2 747	8-08-88 10:46a
	README	BAT 58	6-23-88 10:23a
	TAB36	DBF 35815	6-29-88 9:54a
	AGR	EXE 179692	7-12-88 1:20p
	CCDB	EXE 202788	8-24-89 11:26a
	CDREADER	EXE 39067	8-08-88 10:30a
	RETAIL	EXE 83026	7-09-88 1:20p
	DATA	SCR 4008	4-28-88 9:17a
	MENU	SCR 4103	6-08-88 4:19p
	CALIF	DBF 276	2-04-90 2:39p
	16 File(s) 4771840 bytes free		
Start CCDB profile	C:\CDROM> ccdb		

```

===== COUNTY AND CITY DATA BOOK 1988 =====
|
| STATES | Cities of 25,000 or more
| AL AK AZ AR CA CO CT DE DC FL | Azusa
| GA HI ID IL IN IA KS KY LA ME | Bakersfield
| MD MA MI MN MS MO MT NE NV NH | Baldwin Park
| NJ NM NY NC ND OH OK OR PA RI | Bell
| SC SD TN TX UT VT VA WA WV WI | Bellflower
| WY CALIFORNIA | Bell Gardens
|=====
| SUBJECTS
| Land Area and Population
| Vital Statistics and Health
| Social Welfare Programs (* not covered in this geographic area)
| Crime and Education
| Money Income and Poverty Status
| Personal Income (* not covered in this geographic area)
| Housing
| Civilian Labor Force and Employment
| Agriculture (* not covered in this geographic area)
| Manufactures
| Construction (* not covered in this geographic area)
| Wholesale and Retail Trade
|=====
| -Cursor < Enter-Select PgUp-Page Up PgDn-Page Down Esc-Reset

```

Choosing the city of Bakersfield and the Land Area and Population subject (as shown by shading above) will give the following data about Bakersfield:

```

===== COUNTY AND CITY DATA BOOK 1988 =====
|
| STATES | Cities of 25,000 or more
| AL AK AZ AR CA CO CT DE DC FL | Azusa
| GA HI ID IL IN IA KS KY LA ME | Bakersfield
| MD MA MI MN MS MO MT NE NV NH | Baldwin Park
| NJ NM NY NC ND OH OK OR PA RI | Bell
| SC SD TN TX UT VT VA WA WV WI | Bellflower
| WY CALIFORNIA | Bell Gardens
|=====
| SUBJECTS Land Area and Population
| LAND AREA, 1985 (SQUARE MILES) ..... 78.3
| LAND AREA, 1980 (SQUARE MILES) ..... 73.6
| TOTAL PERSONS, 1986..... 150,400
| RANK OF CITY POPULATION, 1986..... 109
| PERSONS PER SQUARE MILE, 1986..... 1,921
| TOTAL PERSONS, 1980 (CORRECTED)..... 105,611
| NET CHANGE, 1980-1986..... 44,789
| PERCENT CHANGE, 1980-1986..... 42.4
| POPULATION CHARACTERISTICS, 1980:
| PERCENT WHITE..... 76.5
| PERCENT BLACK..... 10.6
| PERCENT AMERICAN INDIAN, ESKIMO, AND ALEUT..... 1.3
|=====
| -Cursor P-Print PgUp-Page Up PgDn-Page Down Esc-Reset Fl-Flag Legend|

```

City county data book has data for four levels of geography: states, counties within states, cities (of 25,000 population or greater), and census designated places (including unincorporated towns of 2,500 population or greater for which census data has been tabulated). The example above retrieved the first screen of items available for the city level of geography.



```

Start place level
database and
show structure

use f:plf01.dbf
display structure
Structure for database: f:plf01.dbf
Number of data records: 9593
Date of last update : 06/06/89
Field  Field Name  Type      Width  Dec
  1  STCO          Character  5
  2  MDCODE       Character  3
  3  PLACECOD     Character  4
  4  LEVEL        Character  1
  5  AREANAME     Character  36
  6  MNY93080    Numeric   9
  7  MNY93086    Numeric   9
  8  MNY92079    Numeric   7
  9  MNY92085    Numeric   7
 10  MNY93186    Numeric   6      1
 11  MNY92185    Numeric   6      1
** Total **                94

copy to d:plf01ca.dbf for stco='06'
401 records copied
Command Line :<D:>:PLF01 :Rec: EOF/9593 : :

Enter a dBASE III PLUS command.

```

and then we can browse the new file to see its contents.

```

to browse
California
extract file

use d:plf01ca
browse

||=====||=====||=====||=====||=====||=====||=====||=====||
|| CURSOR <-- --> | UP DOWN | DELETE | Insert Model Ins |
|| Char | Record| ^X ^Y | Char| Del | Exit| End |
|| Field| Home End | Page| PgUp PgDn | Field| ^Y | Abort| Esc |
|| Panl ^<- ^-> | Help| F1 | Record| ^U | Set Options| ^Home |
||=====||=====||=====||=====||=====||=====||=====||=====||
|STPL-- LEVEL MSA- PMSA CENTRAL STATE PLACE AREANAME----- STATE
|060000 1 0 06 0000 CALIFORNIA CA
|060010 2 7362 5775 0 06 0010 Alameda CA
|060025 2 4472 4480 0 06 0025 Alhambra CA
|060085 2 4472 0360 1 06 0070 Anaheim CA
|060105 2 4472 4480 0 06 0085 Antioch CA
|060175 2 4472 4480 0 06 0105 Arcadia CA
|060180 3 0680 1 06 0105 Azusa CA
|060185 2 4472 4480 0 06 0185 Baldwin CA
|060210 2 4472 4480 0 06 0210 Bell CA
|060215 2 4472 4480 0 06 0215 Bellflower CA
|
|
|BROWSE |<F>|ICIF01 |Rec| 40/1008 | |
|
View and edit fields.

```

### 4.3. Selecting Hispanic Counties

While obtaining California places only presented a mild challenge, the process of discovering US counties with substantial Hispanic population concentration requires significantly more detective work. The Census Bureau does not make it easy because they don't include a comprehensive codebook to document the CCDB CD-ROM file, and so we must search for the data element (field in DBASE terminology) which has Hispanic population. We can begin by examining what documentation the Bureau does provide, as shown in the following table:

Table B. Counties — Population Characteristics and Households

County	Population characteristics—Con.											Households						
	1984—Con.										1980	1985		1980				
	Percent—										Percent—	Number	Percent change, 1980-1985	Persons per household	Number	Percent—		
	Under 5 years	5 to 14 years	15 to 24 years	25 to 34 years	35 to 44 years	45 to 54 years	55 to 64 years	65 to 74 years	75 years and over	American Indian, Eskimo, and Aleut	Asian and Pacific Islander					Hispanic <sup>1</sup>	Female family household <sup>2</sup>	One-person <sup>3</sup>
	14	15	18	17	18	19	20	21	22	23	24	25	28	27	28	29	30	31

<sup>1</sup>Hispanic persons may be of any race. <sup>2</sup>No spouse present. <sup>3</sup>Householder living alone.

TABLE 2 : CCDB County Data Elements

the numbers above the column definitions refer to a field called *ITEM<number>* in DBASE, where <number> is replaced by the actual column number. Looking at the table, we find that percent Hispanic population is ITEM25. Unfortunately, however, we don't know which of the 18 DBF files that ITEM25 is to be found. We can guess that it's probably in COF02.DBF, and display structure for this data subset, as shown below:

```

use f:cof02.dbf
display structure
Structure for database: f:cof02.dbf
Number of data records: 3191
Date of last update : 06/16/89
Field  Field Name  Type      Width  Dec
  1  STCD           Character  5
  2  LEVEL          Character  1
  3  MSA            Character  4
  4  PMSA           Character  4
  5  AREANAME       Character  36
  6  FLAG14         Numeric    1
  7  ITEM14         Numeric    6      1
  8  FLAG15         Numeric    1
  9  ITEM15         Numeric    6      1
 10  FLAG16         Numeric    1
 11  ITEM16         Numeric    6      1
 12  FLAG17         Numeric    1
 13  ITEM17         Numeric    6      1
 14  FLAG18         Numeric    1
 15  ITEM18         Numeric    6      1
 16  FLAG19         Numeric    1
Press any key to continue...
Command Line  :<D>:COF02
Rec: 1/3191
Enter a dBASE III PLUS command.
  
```

But as we can see, this isn't the case.

Fortunately, the Census Bureau has not left us completely in the lurch. Several *dictionary files* have been constructed which describe the contents of the data items and where they are located in the many DBF files.

Directory listing of dictionary files	<pre>dir dct* Database Files      # Records      Last Update      Size DCT_COU.DBF         391            06/07/89         29878 DCT_CTY.DBF         270            06/07/89         20682 DCT_PLC.DBF          6              06/06/89          494 DCT_STA.DBF         292            06/07/89         22354  73408 bytes in    4 files. 0 bytes remaining on drive.</pre>
Choose county dictionary	<pre>use dct_cou.dbf display structure Structure for database: F:dct_cou.dbf Number of data records: 391 Date of last update : 06/07/89 Field  Field Name  Type      Width  Dec   1  ITEM          Character  8   2  DESC          Character  57   3  FILE          Character  8   4  SUB_NO        Numeric    2 ** Total **                76</pre>
Browse the dictionary	<pre>browse Command Line :&lt;F:&gt;:DCT_COU          :Rec: 1/391          :          : Enter a dBASE III PLUS command.    =====  =====  =====  =====      CURSOR &lt;- -&gt;   UP DOWN   DELETE   Insert Mode: Ins      Char:           Record:     Char: Del   Exit:  "Endl    Field: Home End   Page: PgUp PgDn   Field: ^Y   Abort:  Esc      Pan:  ^- ^-&gt;   Help: F1   Record: ^U   Set Options: ^Home     =====  =====  =====  =====   ITEM--- DESC----- FILE--- ITEM22  PERCENT 75 YEARS AND OVER          COF02  FLAG22                                     COF02        TOTAL POPULATION - USED FOR COMPUTING ITEM22A  PERCENTS FOR RACE AND AGE          COF02        POPULATION CHARACTERISTICS, 1980: ITEM23  PERCENT AMERICAN INDIAN, ESKIMO, AND ALEUT          COF03 ITEM24  PERCENT ASIAN AND PACIFIC ISLANDER          COF03 ITEM25  PERCENT HISPANIC          COF03        TOTAL POPULATION (STF-1) - USED FOR COMPUTING ITEM25A  PERCENTS FOR RACE AND HISPANIC          COF03        HOUSEHOLDS:        BROWSE          :&lt;F:&gt;:DCT_COU          :Rec: 36/391          :          :          View and edit fields.</pre>

Using this dictionary file tells us what data base file to use (COF03.DBF) and which item (ITEM25) to use to search on and create our restricted file.



We can now begin the process of determining which counties had high concentrations of Hispanics according to the 1980 Census.

Open the dbf containing percent hispanic	use f:cof03.dbf: list stco,areaname,item25				
	Record#	stco	areaname	item25	
	1	00000	United States	6.45	
	2	01000	ALABAMA	0.86	
	3	01001	Autauga, AL	1.13	
	4	01003	Baldwin, AL	1.01	
	5	01005	Barbour, AL	1.08	
	6	01007	Bibb, AL	1.12	
	7	01009	Blount, AL	0.56	
	8	01011	Bullock, AL	1.51	
	9	01013	Butler, AL	1.33	
	10	01015	Calhoun, AL	1.11	
	11	01017	Chambers, AL	0.91	
	12	01019	Cherokee, AL	0.53	
	13	01021	Chilton, AL	0.55	
	14	01023	Choctaw, AL	0.97	
	15	01025	Clarke, AL		
	Command Line :<D>:COF03			:Rec: EOF/3191	:
	Enter a dBASE III PLUS command.				
Copy to a new file if more than 15 percent hispanic	copy to hispanic.dbf fields stco,level,msa,pmsa,areaname,item23,item24, item25, item25a for item25>15.0 197 records copied				

Once we have obtained this data file we must sort in descending order using the DBASE sort command, and then we can list the contents to find the highest Hispanic concentrated counties in the United States.

Use DBASE sort command to sort to a new file in descending order	sort to hispsrt.dbf on item25/d						
	100% Sorted	197	Records sorted				
	use hispsrt.dbf						
	list stco,areaname,item25a,item25,item24,item23						
	Record#	stco	areaname	item25a	item25	item24	item23
	1	48427	Starr, TX	27266	96.93	0.05	0.10
	2	48479	Webb, TX	99258	91.52	0.09	0.11
	3	48247	Jim Hogg, TX	5168	90.54	0.02	0.00
	4	48323	Maverick, TX	31398	90.34	0.11	2.35
	5	48507	Zavala, TX	11666	89.03	0.03	0.08
	6	35033	Mora, NM	4205	86.56	0.05	0.17
	7	48047	Brooks, TX	8428	85.99	0.04	0.06
	8	48131	Duval, TX	12517	85.76	0.0	
	Command Line :<D>:HISPVRT			:Rec: 1/197	:	:	:
	Enter a dBASE III PLUS command.						

## 5. 1982 Census of Agriculture

A task which one might wish to undertake is to draw information from the 1982 Census of Agriculture for counties with high Hispanic concentrations and combine it with the County data book information just obtained. Some of this information can be found in CCDB itself, but more detailed information would lead us to Census Bureau's CD-ROM TEST DISK 2 which contains the entire 1982 Census of Agriculture. If we pop this disk into our CD-ROM

drive, we can see how the files are organized.

```

Directory of
ag82 data files
on Test Disk 2
display files like ag*.dbf
AG82_01.DBF      AG82_02.DBF      AG82_03.DBF      AG82_04.DBF
AG82_05.DBF      AG82_06.DBF      AG82_07.DBF      AG82_08.DBF
AG82_09.DBF      AG82_10.DBF      AG82_11.DBF      AG82_12.DBF
AG82_13.DBF      AG82_14.DBF      AG82_15.DBF      AG82_16.DBF
AG82_17.DBF      AG82_18.DBF      AG82_19.DBF      AG82_20.DBF
AG82_21.DBF      AG82_22.DBF      AG82_23.DBF      AG82_24.DBF
AG82_25.DBF      AG82_26.DBF      AG82_27.DBF      AG82_DOC.DBF
AG82_GEO.DBF

128747612 bytes in 29 files.
0 bytes remaining on drive.

Command Line :<F:>: : : :

Enter a dBASE III PLUS command.

Open the first
dbf file and
examine its
structure
use ag82_01.dbf
display structure
Structure for database: F:ag82_01.dbf
Number of data records: 3177
Date of last update : 02/03/88
Field Field Name Type Width Dec
1 TAB_01_001 Numeric 12
2 TAB_01_002 Numeric 12
3 TAB_01_003 Numeric 12
4 TAB_01_004 Numeric 12
5 TAB_01_005 Numeric 12
.
.
Press any key to continue...
122 TAB_02_010 Numeric 12
123 TAB_02_011 Numeric 12
124 TAB_02_012 Numeric 12
125 TAB_02_013 Numeric 12
126 TAB_02_014 Numeric 12
127 TAB_02_015 Numeric 12
128 TAB_02_016 Numeric 12
** Total ** 1537
Command Line :<F:>:AG82_01 :Rec: 1/3177 : :
Enter a dBASE III PLUS command.

```

What we find is that the Agriculture data files, unlike the CCDB data files, *don't have any geographic codes in their records!* The sole place for the geographic codes is in a separate file AG82\_GEO.DBF. What this means to the unwary analyst is that the DBASE command JOIN can't be used to merge files from these two databases; a substantially more complex program will have to be constructed if we wish to put together data from these two sources, even though they are ostensibly collected for the same counties. We can look at this geographic file and find out what it contains.

Browse the geographic reference dbf file for 1982 Census of Agriculture

```

use ag82_geo.dbf
browse .....
||-----||-----||-----||-----||-----||-----||-----||-----||
|| CURSOR <-- --> | Record: UP DOWN | DELETE | Insert Mode: Ins |
|| Char:          | Char: Del | Exit:  | End |
|| Field: Home End | Page: PgUp PgDn | Field: ^Y | Abort: Esc |
|| Pan:  "<- ->" | Help: F1 | Record: ^U | Set Options: ^Home |
||-----||-----||-----||-----||-----||-----||-----||-----||
STATE COUNTY NAME-----
01 000 ALABAMA
01 001 AUTAUGA COUNTY
01 003 BALDWIN COUNTY
01 005 BARBOUR COUNTY
01 007 BIBB COUNTY
01 009 BLOUNT COUNTY
01 011 BULLOCK COUNTY
01 013 BUTLER COUNTY
01 015 CALHOUN COUNTY
01 017 CHAMBERS COUNTY
01 019 CHEROKEE COUNTY

```

Note number of counties

```

BROWSE          :<F>:AG82_GEO          :Rec: 1/3177
View and edit fields.

```

Notice that the geographic codes don't have the same name for the two databases. State and county codes are separate on the 1982 Agriculture geography file, while they are concatenated into a single STCO code in the CCDB database files. This further complicates the task of merging the two files. Finally, the above screen shows 3177 counties in the data file, while looking at the CCDB screen at the bottom of page 6 shows 3191 counties in the CCDB file. While this difference can be explained by the independent cities in Virginia and by the Bureau's not releasing Agricultural data for counties with fewer than ten farms, these facts further complicate the database compatibility problem.

Thus our preliminary investigation shows merging City-County Data Book with 1982 Census of Agriculture to be a complicated process beyond the scope of this paper. The key to making this process easier will be the development of standards for geographic coding.

## 6. Conclusions and Recommendations

While the Census Bureau has gone a long way toward making census data available on inexpensive personal computers, certain additional features will make accessibility of CD-ROM census data to the average planner or statistician using these data.

The Census Bureau, in constructing CD-ROM products, should provide

- A comprehensive codebook for data dictionaries which not only names and describes each data item, but also gives its universe, so items are not inadvertently combined.
  - a) An effort should be made to combine items having the same universe into the same DBASE file.

- Uniformity of file structure across databases:

- a) one record per geographic area

- b) The same geographic units over all databases (e.g. either one file for all counties in the U.S. or one file per state)

- c) The same geographic naming structure within each file and across databases (e.g. STCO as in City-County Data Book or STATE, COUNTY as in 1982 Census of Agriculture). This is so that the DBASE 'JOIN' command can be used to connect data from different files or the 'LOCATE FOR' commands will use the same selection sequence for files being connected.

This purpose of this paper has been to give a glimpse of the effort necessary to do more than trivial tasks in retrieving data from the City-County Data Book on CD-ROM. In doing so we have uncovered some of the issues in access to census data. The availability of 1990 Census data on CD-ROM will surely force social science information specialists to confront these issues in this new medium. The application of standards will resolve some problems, but others can be relieved with additional machine-readable documentation from the Census Bureau.

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Day 1, "Real People Doing Real Things," will feature a number of presentations concerning network applications in education from the elementary grades through the college level. The Day 1 activities will begin with a keynote address by Paul Evans Peters, Director, Coalition for Networked Information and will close with a tour of the Merit Network Operations Center.

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The seminar will be held at the Tenneco Automotive Training and Development Center in Ann Arbor. Microcomputers connected to regional and national networks will be available on-site so that attendees may access network resources discussed in the presentations.

The registration fee is \$395. An early-bird fee of \$345 will be charged for registrations received before April 15, 1991. This fee includes the two-day seminar, a reception on Sunday evening, lunch on Monday and Tuesday, all seminar material, and an optional tour of the Network Operations Center.

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