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File Information Display Utility User's Guide

StorHouse®

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Contents

Welcome

The *File Information Display Utility User's Guide* is a reference document for users of the File Information Display Utility. The File Information Display Utility (LSMFI) is available on IBM™ MVS™ hosts. It consists of three Callable Interface functions that return information about StorHouse® files. Such information can be used to produce reports on file usage and to determine which files may be migrated off-line.

Intended Audience

This document is intended for all users of the File Information Display Utility.

Contents of the Document

This document consists of two chapters:

- Chapter 1, "Introduction," describes File Information Display Utility functions and call statement format. It also discusses user responsibilities and important information about using the File Information Display Utility.

- Chapter 2, "File Information Display Utility Functions," describes the purpose, format, parameters, return codes, and other important information for START-SEARCH, NEXT-FILENAME, and END-SEARCH, the three File Information Display Utility functions.

Related Documentation

Users may wish to refer to the following additional StorHouse documentation:

- The *Callable Interface Programmer's Guide*, publication number 900013 for IBM MVS hosts and the Generic *Interface Programmer's Guide*, publication number 900046 for all other hosts, are references for programmers who write applications that use the Callable Interface. These guides explain the functions of the Callable Interface and contain a sample program.

- The *Messages and Codes Manual*, publication number 900032, lists all StorHouse system and host software messages by status code. Also, it gives the meaning of each message and indicates any actions to take as a result of the messages. This manual is intended for all users.

- The *Command Language Reference Manual*, publication number 900005, is a general reference guide for the StorHouse Command Language. It contains a complete description of SHOW FILE, the interactive command that returns the same information as LSMFI.

Notational Conventions

This book uses the following conventions for illustrating command formats, presenting examples, and identifying special terms:

Convention	Meaning
Angle brackets (< >)	Enclose optional entries
Braces ({ })	Enclose descriptive terms or a choice of entries
Courier font	Code
Ellipses (...)	A repetition of the preceding material
Italics	New terms and emphasized text
lower case Helvetica font	User entries
UPPER CASE	System responses and StorHouse terms

Introduction

The File Information Display Utility (LSMFI) is a set of three host Callable Interface functions that return information about StorHouse files. The information can be used to produce quantitative reports on file usage and to determine which files can be migrated off-line. LSMFI's parameter structure is basically similar to the parameter structure of other Callable Interface functions.

LSMFI returns the same information as the interactive SHOW FILE command. Refer to the *Command Language Reference Manual* in the StorHouse User Document Set for a description of SHOW FILE.

LSMFI Function Codes

There are three valid LSMFI functions:

- START-SEARCH
- NEXT-FILENAME
- END-SEARCH

To retrieve file information, the user application must make at least two calls to LSMFI: the first must specify START-SEARCH, and the second must specify NEXT-FILENAME. A call to END-SEARCH is optional.

START-SEARCH

START-SEARCH initializes a file search operation and returns information for the first file that matches the search criteria. START-SEARCH supplies group and file name patterns, a data area, and other search criteria. The group and file names may contain the StorHouse wild card character. The user must also supply the number of elements that will be returned in the file attribute list.

NEXT-FILENAME

NEXT-FILENAME retrieves file name, group name, and associated file attributes for the next StorHouse file that matches the search criteria set by START-SEARCH. NEXT-FILENAME may be repeated if the file and/or group names contain the StorHouse wildcard character.

END-SEARCH

END-SEARCH permits a user to terminate a search before all matching file names are returned. All allocated resources are released. If a search is terminated without calling END-SEARCH and there are more files to process, allocated resources are not released.

The next chapter explains these functions in detail.

LSMFI CALL Statement Format

The format of the LSMFI call statement is:

CALL 'LSMFI' USING function-code, C-TOKEN, R-CODE, ...

- Function code is a 16-character string that has the value START-SEARCH, NEXT-FILENAME, or END-SEARCH.

- C-TOKEN is the session identifier, or connect token, returned by the CONNECT function (see LSMCALL).

- R-CODE is the return code set by LSMFI to the final status from the operation.

User Responsibilities

The user is responsible for establishing the StorHouse session (LSMCALL CONNECT), supplying the C-TOKEN associated with the StorHouse session to LSMFI, and ending the StorHouse session (LSMCALL DISCONNECT). The user is also responsible for supplying a data area that contains both working storage required by LSMFI and storage for the values returned to the calling application. It is not necessary to initialize this data area.

Notes

A wildcard file search may require substantial amounts of virtual memory and may take much longer than catalog/VTOC searches.

LSMFI does not return information for individual file extents. Extent information returned by the StorHouse Command Language SHOW FILE /EXTENT command is summarized over all of a file's extents. This summarization is discussed in the documentation of the returned file attributes. For information about extents, refer to the *StorHouse Concepts and Facilities Manual*.

File Information Display Utility Functions

This chapter describes START-SEARCH, NEXT-FILENAME, and END-SEARCH, the three functions that make up the File Information Display Utility.

Each function description includes a function overview, followed by a statement format for COBOL and a working-storage section. Definitions of parameters and return codes follow. The detailed function description discusses the purpose, effects, and special requirements of the function. Finally, any additional requirements or important general information about the function appears under "Notes."

START-SEARCH

START-SEARCH initializes a file information search and returns information for the first file that matches the search criteria. The caller supplies the file name and group name search patterns. START-SEARCH requires the standard StorHouse features.

Statement Format for COBOL

```
CALL 'LSMFI' USING START-SEARCH,C-TOKEN,R-CODE,
                    FILE-NAME-PATTERN,VERSION,
                    GROUP-NAME-PATTERN,FILE-READ-PASSWORD,
                    GROUP-READ-PASSWORD,UNUSED-TIME,LEVEL,
                    MAX-MEMORY,ATTR-COUNT,DATA-AREA,FSET,
                    VSET, VOLUME.
```

Working-Storage Section

```
01 START-SEARCH             PIC X(16) VALUE 'START-SEARCH'.
01 C-TOKEN                  PIC S9(8) COMP SYNC.
01 R-CODE                   PIC S9(8) COMP SYNC.
01 FILE-NAME-PATTERN        PIC X(56).
01 VERSION                  PIC X(6).
01 GROUP-NAME-PATTERN       PIC X(8).
01 FILE_READ_PASSWORD       PIC X(8).
01 GROUP-READ-PASSWORD      PIC X(8).
01 UNUSED-TIME              PIC X(20).
01 LEVEL                    PIC S9(8) COMP SYNC.
01 MAX-MEMORY               PIC X9(8) COMP SYNC.
01 ATTR-COUNT               PIC X9(8) COMP SYNC.
01 DATA-AREA.
   05 WORKAREA              PIC X(256).
   05 FILE-NAME             PIC X(56).
   05 GROUP-NAME            PIC X(8).
   05 CREATE-DATE           PIC X(20).
   05 LAST-REF-DATE         PIC X(20).
   05 VOLUME                PIC X(24).
   05 FILE-ATTRIB.
      10 FATTR-MAX-RECORD-LEN  PIC S9(8) COMP SYNC.
      10 FATTR-SIZE            PIC S9(8) COMP SYNC.
      10 FATTR-VERSION-NUM     PIC S9(8) COMP SYNC.
      10 FATTR-FST             PIC S9(8) COMP SYNC.
      10 FATTR-ATTR            PIC S9(8) COMP SYNC.
      10 FATTR-VTF             PIC S9(8) COMP SYNC.
      10 FATTR-ATF             PIC S9(8) COMP SYNC.
      10 FATTR-PROT-READ       PIC S9(8) COMP SYNC.
      10 FATTR-PROT-WRITE      PIC S9(8) COMP SYNC.
      10 FATTR-PROT-DELETE     PIC S9(8) COMP SYNC.
      10 FATTR-ACCESS-COUNT    PIC S9(8) COMP SYNC.
      10 FATTR-LIMIT           PIC S9(8) COMP SYNC.
      10 FATTR-TYPE            PIC S9(8) COMP SYNC.
      10 FATTR-EDC-TYPE        PIC S9(8) COMP SYNC.
```

```
        10  FATTR-ORG               PIC S9(8) COMP SYNC.
        10  FATTR-TRANS             PIC S9(8) COMP SYNC.
        10  FATTR-MF                PIC S9(8) COMP SYNC.
        10  FATTR-ST-DIS            PIC S9(8) COMP SYNC.
        10  FATTR-ST-PRI            PIC S9(8) COMP SYNC.
        10  FATTR-ST-NEW            PIC S9(8) COMP SYNC.
        10  FATTR-LEVEL             PIC S9(8) COMP SYNC.
     05  FILE-FSET                  PIC X(8).
     05  FILE-VSET                  PIC X(8).
 01 FSET                            PIC X(8).
 01 VSET                            PIC X(8).
 01 VOLUME                          PIC X(15).
```

Parameter Overview

C-TOKEN — Session identifier returned by CONNECT.

R-CODE — Final status from the requested operation; see the following section "Return Codes."

FILE-NAME-PATTERN — File name search pattern; may be a complete StorHouse file name or zero or more leading characters of a file name followed by the StorHouse wildcard character.

VERSION — Relative version number of the file. VERSION may be specified as a character string with a leading minus sign or as the StorHouse wildcard character. The *Command Language Reference Manual* explains how to specify the VERSION parameter. When VERSION is set to zero or blanks, LSMFI returns information for the current version of each file name.

GROUP-NAME-PATTERN — File access group name search pattern. GROUP-NAME-PATTERN may be a complete group name or zero or more leading characters of a group name followed by the StorHouse wildcard character. If no group name is supplied, the StorHouse default group name for the session is used.

FILE-READ-PASSWORD — Read password for the requested file. For a file with a read password, information is returned only if the correct password is supplied. This parameter must be blank for any search involving a wildcard character in either the file name pattern or the group name pattern.

GROUP-READ-PASSWORD — Read password for the file access group. For a group with a read password, information is returned only if the correct password is supplied. This parameter must be blank for any search involving a wildcard character in the group name pattern.

UNUSED-TIME — Time value used to select file names. If non-blank, only the names of files that have *not* been referenced since the specified time are returned. If blank, the names of all files matching the file name, group name, and version patterns are returned. Refer to the *Command Language Reference Manual* in the StorHouse User Document Set for information about how to specify the format of time fields.

LEVEL

Storage level identifier. If non-zero, the file list contains only names of files residing on the specified storage level. If zero (0), the file list contains names of files residing on all storage levels. The values for LEVEL are: 0 for any storage level; 1 for level F (fixed); 2 for level L (library); and 3 for level S (shelf). Files in the performance buffer are considered to reside on the storage level that contains their primary file set.

MAX-MEMORY

Maximum amount of virtual memory that may be obtained by LSMFI. If set to zero (0), memory use is restrained only by available memory. Memory is allocated in 32 KB units.

Insufficient memory causes the search to fail with a return code of 3067, and no file information is made available. If called next, NEXT-FILENAME also returns error code 3067.

After an insufficient memory (3067) return, the value in the MAX-MEMORY parameter is reset to the total amount of memory in K bytes (K=1024) that is needed to complete the requested file search. LSMFI can be re-executed by resetting MAX-MEMORY to a value that is no smaller than the returned value times 1024.

The amount of memory required per file varies, because some fields are compressed. The minimum amount of memory is 72 bytes per file; the worst case is 168 bytes per file.

ATTR-COUNT

Number of entries in the FILE-ATTRIB list. Twenty-one entries must be provided to retrieve all possible file information. If fewer entries are specified, information in the missing entries at the end of the list is omitted.

DATA-AREA

File information return area. DATA-AREA is not initialized by the caller. The returned values should be used only after START-SEARCH or NEXT-FILENAME has been called and completes with a return code of zero.

The elements in DATA-AREA are:

- WORKAREA – Area used by LSMFI for status information during the retrieval process; should not be accessed by the caller.

- FILE-NAME – File name for which attribute information is being supplied.

- GROUP-NAME – File access group name.

- CREATE-DATE – Date the file was created. CREATE-DATE is expressed in EBCDIC characters. The *Command Language Reference Manual* explains the format of valid date fields.

- LAST-REF-DATE – Date the specified file version was last referenced (same format as CREATE-DATE).

- VOLUME – Volume identification code (vid) of the volume where the file resides. The *Command Language Reference Manual* explains the format of volume identification codes. The returned vid is from the file's first extent. For level F files, VOLUME is not applicable and contains blanks.

- FILE-ATTRIB – List of file attributes that are returned to the caller. The value of the ATTR-COUNT parameter in the START-SEARCH call controls the number of attributes in the list.

  The file attributes are:

  - FATTR-MAX-RECORD-LEN – length of the file's longest record in bytes (returned in decimal).

  - FATTR-SIZE – file size in kilobytes (rounded up).

  - FATTR-VERSION-NUM – file's relative version number.

  - FATTR-FST – file system type (returned in decimal). Valid values are:

VALUE (Decimal)	FILE SYSTEM TYPE
03	IBM MVS DF/DSS Unload
04	IBM MVS Fast Dump Restore (track copy)
65	Transportable ASCII character-stream
66	Transportable binary.

  - FATTR-ATTR – File Attribute value. The File Attribute value is given in a hexadecimal bit map and returned in decimal format according to the following table:

BIT (Decimal)	DEFINITION
32	Print format (machine carriage control)
64	Print format (ANSI carriage control)
128	Fixed record length.

- FATTR-VTF – VTF value. Valid values are zero (0), indicating NEVER; 1, indicating NOW; 2, indicating NEXT, or 3, indicating DIRECT.

- FATTR-ATF – ATF value. Valid values are 1, 2, or 3.

- FATTR-PROT-READ – read protection flag. A non-zero value indicates that the file has a read password.

- FATTR-PROT-WRITE – write protection flag. A non-zero value indicates that the file has a write password.

- FATTR-PROT-DELETE – delete protection flag. A non-zero value indicates that the file has a delete password.

- FATTR-ACCESS-COUNT – number of times the file has been accessed.

- FATTR-LIMIT – file version limit.

- FATTR-TYPE – file type identifier. The value 01 indicates a standard, StorHouse framed file. Any other value indicates an error.

- FATTR-EDC-TYPE – type of error detection code (EDC). Valid values are zero (0), 1, or 2. Zero (0) indicates that no EDC is generated. Values 1 and 2 indicate the specific algorithm used to generate EDCs. The algorithm indicated by the value 2 is supported on StorHouse by high-speed hardware.

- FATTR-ORG – file organization. Zero (0) indicates non-VRAM™; 1 indicates VRAM.

- FATTR-TRANS – transfer type. One (1) indicates that the file was created with the DIRECT option.

- FATTR-MF – migration factor (returned in decimal). StorHouse uses the migration factor to determine when to migrate files from the performance buffer. Migration factors apply to individual file extents. The value returned is the smallest migration factor for any extent.

- FATTR-ST-DIS – disabled status flag. A non-zero value indicates a disabled file (either hardware or software disabled). A file is flagged as disabled if any file extent is disabled.

- FATTR-ST-PRI – primary status flag. This field always equals 1.

- FATTR-ST-NEW – new status flag. A non-zero value indicates that the file is in the performance buffer and has not been migrated.

- FATTR-LEVEL – storage level. One (1) indicates that the file is on level F (fixed) storage. Two (2) indicates that the file is on level L (library) storage. Three (3) indicates that the file is on level S (shelf) storage. Larger values may be used in future releases. Files in the performance buffer are considered to reside on the storage level that contains their primary file set.

   The level applies to individual file extents. The value returned is the numerically largest (slowest layer) of any extent.

- FILE-FSET – Name of the file set that contains the file.

- FILE-VSET – Name of the volume set that contains the file.

FSET   File set identifier. If non-blank, only files that reside on the specified FSET are selected for display. If blank, FSET is not used to select files for display. FSET is mutually exclusive with VOLUME.

VSET   Volume set identifier. If non-blank, only files that reside on the specified VSET are selected for display. If blank, VSET is not used to select files for display. VSET is mutually exclusive with VOLUME.

VOLUME   Volume identification code. If non-blank, only files that reside on the specified volume side are selected for display. If blank, VOLUME is not used to select files for display. VOLUME is mutually exclusive with FSET and VSET. An example of a valid volume identification code is:

OAD253EFD2D:B

Return Codes

A non-zero return code indicates that file information cannot be retrieved. If NEXT-FILENAME is called after START-SEARCH returns a non-zero code, it returns the same value. Specific non-zero codes are:

3067   The caller provided insufficient memory. The search fails, and no file name list is returned. When this occurs, LSMFI resets MAX-MEMORY to the amount of memory in K bytes (K=1024) that is actually required to complete the search. The caller can re-execute START-SEARCH using a new MAX-MEMORY value of at least 1024 times the returned value.

3068   No file names match the supplied search criteria.

3070   The user application passed an invalid function code.

3072   The value of ATTR-COUNT is invalid.

Any other non-zero return code indicates an error condition that prevents file name processing. In this case, use EMSG to retrieve associated text messages. Refer to the *Callable Interface Programmer's Guide* for a description of EMSG.

Detailed Function Description

START-SEARCH initializes the StorHouse file name search and uses caller-supplied search criteria to determine the list of StorHouse files that match the specified search patterns. Information for the first file match is returned to a caller-supplied data area.

The user must call NEXT-FILENAME to retrieve information for all other matching files.

Notes

DATA-AREA retains status information for the retrieval sequence. Several file name searches can be processed in parallel by calling START-SEARCH with separate data areas.

NEXT-FILENAME

NEXT-FILENAME retrieves file name and file attribute information for the next StorHouse file that matches the search criteria set by START-SEARCH. NEXT-NAME requires the standard StorHouse features.

Statement Format for COBOL

```
CALL 'LSMFI' USING NEXT-FILENAME,C-TOKEN,R-CODE,DATA-AREA.
```

Working-Storage Section

```
01 NEXT-FILENAME              PIC X(16) VALUE 'NEXT-
                              FILENAME'.
01 C-TOKEN                    PIC S9(8) COMP SYNC.
01 R-CODE                     PIC S9(8) COMP SYNC.
01 DATA-AREA
   05 WORKAREA                PIC X(256).
   05 FILE-NAME               PIC X(56).
   05 GROUP-NAME              PIC X(8).
   05 CREATE-DATE             PIC X(20).
   05 LAST-REF-DATE           PIC X(20).
   05 VOLUME                  PIC X(24).
   05 FILE-ATTRIB.
      10 FATTR-MAX-RECORD-LEN  PIC S9(8) COMP SYNC.
      10 FATTR-SIZE            PIC S9(8) COMP SYNC.
      10 FATTR-VERSION-NUM     PIC S9(8) COMP SYNC.
      10 FATTR-FST             PIC S9(8) COMP SYNC.
      10 FATTR-ATTR            PIC S9(8) COMP SYNC.
      10 FATTR-VTF             PIC S9(8) COMP SYNC.
      10 FATTR-ATF             PIC S9(8) COMP SYNC.
      10 FATTR-PROT-READ       PIC S9(8) COMP SYNC.
      10 FATTR-PROT-WRITE      PIC S9(8) COMP SYNC.
      10 FATTR-PROT-DELETE     PIC S9(8) COMP SYNC.
      10 FATTR-ACCESS-COUNT    PIC S9(8) COMP SYNC.
      10 FATTR-LIMIT           PIC S9(8) COMP SYNC.
      10 FATTR-TYPE            PIC S9(8) COMP SYNC.
      10 FATTR-EDC-TYPE        PIC S9(8) COMP SYNC.
      10 FATTR-ORG             PIC S9(8) COMP SYNC.
      10 FATTR-TRANS           PIC S9(8) COMP SYNC.
      10 FATTR-MF              PIC S9(8) COMP SYNC.
      10 FATTR-ST-DIS          PIC S9(8) COMP SYNC.
      10 FATTR-ST-PRI          PIC S9(8) COMP SYNC.
      10 FATTR-ST-NEW          PIC S9(8) COMP SYNC.
      10 FATTR-LEVEL           PIC S9(8) COMP SYNC.
   05 FILE-FSET               PIC X(8).
   05 FILE-VSET               PIC X(8).
```

Parameter Overview

C-TOKEN   Session identifier returned by CONNECT. This must be the same C-TOKEN that is supplied to START-SEARCH.

R-CODE   Final status from the requested operation; see the following section "Return Codes."

DATA-AREA   File information return area. The caller must not alter this area.

     DATA-AREA must be supplied to START-SEARCH prior to its use for NEXT-FILENAME. The values in DATA-AREA should only be used after NEXT-FILENAME has returned an R-CODE of zero (0).

Return Codes

3068   No more file names match the supplied search criteria.

3070   The application passed an invalid function code.

     Any other non-zero code indicates an error condition that prevents retrieval of file information. In this case, do not use the contents of DATA-AREA. Call EMSG to retrieve associated text messages.

Detailed Function Description

NEXT-FILENAME retrieves the name of the next StorHouse file that matches the search criteria set by START-SEARCH. The function returns the file name, group name, and file characteristics. Repeated calls to NEXT-FILENAME can be used to retrieve information for all other matching files.

Notes

DATA-AREA retains status information for the retrieval sequence. Several file name searches can be processed in parallel by using separate data areas.

Normally, NEXT-FILENAME is called until it returns R-CODE 3068. However, an application can call END-SEARCH to terminate a search before all matching file names have been processed. Failure either to call NEXT-FILENAME until the return code is 3068 or to call END-SEARCH results in the accumulation of resources (virtual memory) allocated by LSMFI.

END-SEARCH

END-SEARCH terminates the file information search before all file names are returned. The caller supplies the data area associated with the search. END-SEARCH requires the standard StorHouse features.

Statement Format for COBOL

```
CALL 'LSMFI' USING END-SEARCH,C-TOKEN,R-CODE,DATA-AREA.
```

Working-Storage Section

```
01 END-SEARCH                  PIC X(16) VALUE 'END-SEARCH'.
01 C-TOKEN                     PIC S9(8) COMP SYNC.
01 R-CODE                      PIC S9(8) COMP SYNC.
01 DATA-AREA
   05 WORKAREA                 PIC X(256).
   05 FILE-NAME                PIC X(56).
   05 GROUP-NAME               PIC X(8).
   05 CREATE-DATE              PIC X(20).
   05 LAST-REF-DATE            PIC X(20).
   05 VOLUME                   PIC X(24).
   05 FILE-ATTRIB.
      10 FATTR-MAX-RECORD-LEN  PIC S9(8) COMP SYNC.
      10 FATTR-SIZE            PIC S9(8) COMP SYNC.
      10 FATTR-VERSION-NUM     PIC S9(8) COMP SYNC.
      10 FATTR-FST             PIC S9(8) COMP SYNC.
      10 FATTR-ATTR            PIC S9(8) COMP SYNC.
      10 FATTR-VTF             PIC S9(8) COMP SYNC.
      10 FATTR-ATF             PIC S9(8) COMP SYNC.
      10 FATTR-PROT-READ       PIC S9(8) COMP SYNC.
      10 FATTR-PROT-WRITE      PIC S9(8) COMP SYNC.
      10 FATTR-PROT-DELETE     PIC S9(8) COMP SYNC.
      10 FATTR-ACCESS-COUNT    PIC S9(8) COMP SYNC.
      10 FATTR-LIMIT           PIC S9(8) COMP SYNC.
      10 FATTR-TYPE            PIC S9(8) COMP SYNC.
      10 FATTR-EDC-TYPE        PIC S9(8) COMP SYNC.
      10 FATTR-ORG             PIC S9(8) COMP SYNC.
      10 FATTR-TRANS           PIC S9(8) COMP SYNC.
      10 FATTR-MF              PIC S9(8) COMP SYNC.
      10 FATTR-ST-DIS          PIC S9(8) COMP SYNC.
      10 FATTR-ST-PRI          PIC S9(8) COMP SYNC.
      10 FATTR-ST-NEW          PIC S9(8) COMP SYNC.
      10 FATTR-LEVEL           PIC S9(8) COMP SYNC.
   05 FILE-FSET                PIC X(8).
   05 FILE-VSET                PIC X(8).
```

Parameter Overview

C-TOKEN   Session identifier returned by CONNECT.

R-CODE   Final status from the requested operation; see the following section "Return Codes."

DATA-AREA File information return area. No new information is returned to DATA-AREA after END-SEARCH completes. However, LSMFI requires the contents of DATA-AREA to terminate properly. Disregard any residual information in DATA-AREA.

Return Codes

3068   END-SEARCH was called after all file names have been returned.

3070   The user application passed an invalid function code.

Detailed Function Description

END-SEARCH terminates the file name search before all file names are returned and deallocates resources acquired by LSMFI. The caller supplies the data area that is used for the search. This data area must have been set up by START-SEARCH and may have been used for zero or more NEXT-FILENAME operations.

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