

Description of storage JEVEUX with HDF format

Summarized:

One describes here the organization of file HDF adopted to store the contents of a base JEVEUX. This file contains an image of all the JEVEUX objects created on the global database at the time of the safeguard and can be used to launch an execution in poursuite on the platform of initial execution or any other platform compatible and having the version carried of *Code_Aster*.

1 General information

By default, the manager of JEVEUX memory employed in *Code_Aster* uses several files of direct access of binary type. These files constitute the “bases” JEVEUX, the data structures which will again be used in the event of poursuite of computation are stored in the global database in a format specific to the manager of memory. During computation, the manager of memory is brought to use the bases to discharge the memory temporarily, thus the access mode chosen for his performances in this mode of use is not adapted to a safeguard especially if he one wants to make them independent of the platform.

The use of library HDF, already used in the frame of the interchange format of data MED, for a writing of the contents of bases JEVEUX appears much more adapted. The file obtained after safeguard can be easily transferred, after a possible compression, on a local platform to carry out for example postprocessing operations with a version carried of *Code_Aster*.

A file with HDF format is organized like a tree structure file Unix, the notion of “group” are connected with the notion of directory, the notion of “dataset” corresponds to the file. Moreover it is possible to assign attributes to each level of “group” and/or to each “dataset”. We exploited these some notions to organize the recopy of all the JEVEUX objects contained in a base.

HDF provides a utility (h5dump) making it possible to write with format ASCII the contents of a whole file, it is thus very easy, for files of reasonable size, to obtain the contents of all the objects constituting a base JEVEUX.

2 Writing of objects simple JEVEUX

objects simple JEVEUX are in general of homogeneous type, they are stored in a “dataset” being called after the simple object on the level of the “group”/. The simple objects of name directory kind contain at the same time an array of h-coding of the type INTEGER and the list of the stored names of type CHARACTER and must be treated except for. They are divided to store two “datasets” of respective names T_HCOD and T_NOM on the level of a group being called after the simple object on the level of the “group”/.

One associates a named list “ATTRIBUTES JEVEUX” of 5 attributes with all the “datasets” associated with the simple objects and all the groups associated with the name directories containing respectively:

- 1) a text (“SIMPLE OBJET”),
- 2) an identifier (identifying of object simple JEVEUX),
- 3) a character string containing the class, the kind and the type with meaning JEVEUX (argument of JECREO),
- 4) associated the Fortan type,
- 5) a null string

the objects systems JEVEUX contain all information of type attribute JEVEUX and make it possible to rebuild data structure associated. They do not differ from objects simple JEVEUX, accessible to the user, that by their name, they are treated in the same way. The systems objects are of homogeneous type and thus do not pose a particular problem of storage. One stores each JEVEUX object in a “dataset” being called after the system object on the level of the “group”/.

One associates a named list “ATTRIBUTES JEVEUX” of 5 attributes with all the “datasets” associated with the system objects containing respectively:

- 1) a text (“OBJET SYSTEME”),
- 2) an identifier (identifying of object simple JEVEUX),
- 3) a character string containing the class, the kind and the type with meaning JEVEUX,
- 4) associated the Fortan type,
- 5) a null string

the attributes associated with the "dataset" or the "groups" will be used during the relecture of file HDF to rebuild data structures associated with the JEVEUX objects .

3 Writing of collections JEVEUX

3.1 contiguous Collections

the contiguous collections are built from simple objects, it is thus easy to use the methods associated with the simple objects to store these last. The objects of contiguous collection are stored in the segment of values associated with the system object \$\$DESO.

The object simple descriptor of collection is stored in a "dataset" being called after the collection under the " group"/.

One associates a named list "ATTRIBUTES JEVEUX" of 5 attributes with the associated "dataset" containing respectively:

- 1) a text ("COLLECTION"),
- 2) an identifier (identifying of object simple JEVEUX),
- 3) a character string containing the class, the kind (x) and the type with meaning JEVEUX (I),
- 4) associated the Fortan type,
- 5) a null string.

The system objects of collection are stored in "datasets" being called after each system object of collection under the "group"/.

One associates a named list "ATTRIBUTES JEVEUX" of 5 attributes with the associated "dataset" containing respectively:

- 1) a text ("OBJ. SYSTEME COLLECTION"),
- 2) an identifier (identifying of object simple JEVEUX),
- 3) a character string containing the class, the kind and the type with meaning JEVEUX,
- 4) associated the Fortan type,
- 5) a null string.

3.2 Dispersed collections

the dispersed collections are built from simple objects for the systems objects of collection and segment of values associated with each object with collection. The systems objects are stored in the same way that for the collection contiguous. The system object \$\$DESO is particular because it is not associated in the case of the collections dispersed with a segment of values, there is not thus an associated "dataset", and it is only by charging the contents with the objects systèmes JEVEUX that the dispersed collection is rebuilt during the relecture of file HDF.

A " group" being called after the collection supplemented by __OBJETS is created on the level of the " group"/to write the objects of dispersed collection. One associates a named list "ATTRIBUTES JEVEUX" of 5 attributes with the "group", only the first element is nonempty and contains a text (COLLECTION).

Each object of collection is then written in a "dataset" being called after the collection supplemented by the number of the object of collection (including for the named collections) under the "group" describes above.

One associates a named list "ATTRIBUTES JEVEUX" of 5 attributes with the associated "dataset" containing respectively:

- 1) a text (OBJET OF COLLECTION),
- 2) the name or the number of the object of collection and the identifier of collection,

- 3) a character string containing the class, the kind and the type with meaning
JEVEUX,
- 4) associated the Fortan type,
- 5) a null string.

4 Heading of the file

One stores a named list "Global database JEVEUX" of 5 attributes associated with the "group" containing respectively:

- 1) a text identifying the version of *Code_Aster* used to build the file,
- 2) the name of the server of computation used,
- 3) the name of the system on the server,
- 4) the date of execution of the code,
- 5) 3 characteristics machine (length out of bits of the standard integer, length in bytes of the standard integer, length in bytes of the unit of addressing).

The first information is used during the relecture for if required emitting an alarm when the version of *Code_Aster* used differs. Certain data structures or catalogs can appear incompatible.

5 Example of file

Here an example of file HDF obtained from the carrying out of the test TTLL01A and from which representation ASCII is resulting from the utility h5dump. One gives only some extracts here illustrating descriptions of the principal JEVEUX objects .

```
HDF5 "resu64.hdf" {
GROUP "/" {
  ATTRIBUTE "Global database JEVEUX" {
    DATATYPE H5T_STRING {
      STRSIZE 24;
      STRPAD H5T_STR_SPACEPAD;
      CSET H5T_CSET_ASCII;
      CTYPE H5T_C_S1;
    }
    DATASPACE SIMPLE {(5)/(5)}
    DATED {
      "8/13/2003      7. 1.13", "CLA4ASTR.CLA.EDF", "OSF1"      , "
      MA-19-AOUT      - 2003 10:35: 24", "LBIS=64 MODELS
      = 8 LOUA= 1"}} DATASET

"&&
SYS .CODE" {DATATYPE H
  5T_STRING {STRSIZE 8;
    STRPAD H5T_
    STR_SPACEPAD; CSET H5T_CSET
    _ASCII; CTYPE H5T_C
    _S1; } DATASPACE

SIMPLE {( 3)/(3)} DATED {"TTLL
01A",
  "15", "95"      } ATTRIBUTE
"
ATTRIBUTES JEVEUX" {DATATYPE H
  5T_STRING {STRSIZE 24;
    STRPAD H5T_
    STR_SPACEPAD; CSET H5T_CSET
    _ASCII; CTYPE H5T_C
    _S1; } DATASPACE
```

```

SIMPLE {( 5)/(5)} DATED {"OBJET
SIMPLE
  ", "30",          "G V K8          ",
  "CHARACTER          *8", ""}
}...
GROUP

"
TEMPE
.DESC" {ATTRIBUTE          "
  ATTRIBUTES JEVEUX" {DATATYPE H
    5T_STRING {STRSIZE 24;
      STRPAD H5T_
      STR_SPACEPAD; CSET H5T_CSET
      _ASCII; CTYPE H5T_C
      _S1; } DATASPACE

SIMPLE {( 5)/(5)} DATED {"OBJET
SIMPLE
  ", "287",          "G N          K16"
  , "CHARACTER          *16", ""}
  DATASET

"T_
HCOU" {DATATYPE H
  5T_STANDARD_I64 LE DATASPACE
  SIMPLE {( 43)/(43)} DATED {
    37,344,16
    ,
    18,18,6,0,0,0,18,8,6,4,0,0,0,7,0,0,0,0,13,17,12,0,16,11,2,0,5,0,15,
14,1,0,9,0,3,0,10,0,0,0}
  } DATASET

"T_
NOM" {DATATYPE H
  5T_STRING {STRSIZE 16;
    STRPAD H5T_
    STR_SPACEPAD; CSET H5T_CSET
    _ASCII; CTYPE H5T_C
    _S1; } DATASPACE

SIMPLE {( 18)/(18)} DATED {"TEMP
  ", "
  FLUX_ELGA          ", "FLUX_ELNO ", "FLUX_NOEU
  ", "META_ELGA_TEMP ", "META_ELNO ", "META_NOEU
  ", "DURT_ELGA META", "DURT_ELNO ", "DURT_NOEU
  ", "HYDR_ELGA ", "HYDR_ELNO ", "HYDR_NOEU
  ", "DETE_ELNO ", "DETE_NOEU ", "COMPOTHER
  ", "ERTH_ELEM_TEMP ", "ERTH_ELNO_ELEM "}}} DATASET

"TEMPE
.INST" {DATATYPE          H
  5T_IEEE_F64 LE DATASPACE
  SIMPLE {( 42)/(42)} DATED {0,0.0001
  ,
  0.0002,0.0003,0.0004,0.0005,0.0006,0.0007,0.0008,0.0009,0.001
  ,

```

```
0.002,0.003,0.004,0.005,0.006,0.007,0.008,0.009,0.01,0.02,0.1,0.2,0.7,  
2,1.79769e+308, 1.79769e+308, 1.79769e+308, 1.79769e+308  
, 1.79769e+308, 1.79769e+308, 1.79769e+308, 1.79769e+308, 1.79769e+308  
, 1.79769e+308, 1.79769e+308, 1.79769e+308, 1.79769e+308, 1.79769e+308  
, 1.79769e+308, 1.79769e+308, 1.79769e+308} ATTRIBUTE
```

“

```
ATTRIBUTES JEVEUX" {DATATYPE H  
5T_STRING {STRSIZE 24;  
STRPAD H5T_  
STR_SPACEPAD; CSET H5T_CSET  
_ASCII; CTYPE H5T_C  
_S1; } DATASPACE
```

```
SIMPLE {( 5)/(5)} DATED {"OBJET
```

```
SIMPLE
```

```
" , "293", "G V R",  
"REAL*8 " , "" }  
}...
```