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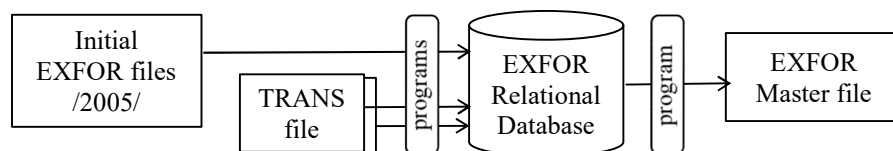
Memo CP-D/1096

Date: 2023-10-31
To: Distribution
From: V. Zerkin
Subject: Java program for local maintenance of EXFOR Master file
Reference: NRDC-2023:A91, WP2004-11, WP2005-13, CP-D/1093

NRCD-2023 Action A91:

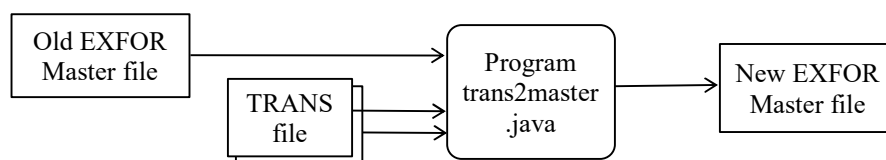
| | | |
|-----|------------------|---|
| A91 | Otsuka Zerkin | ...Prepare and distribute among NRDC members a software generating next Master File using previous Master File and TRANS file providing possibility for every NRDC Data Centre to maintain and reproduce Master File locally. |
|-----|------------------|---|

According to EXFOR Protocol: “NDS will maintain and distribute the EXFOR Master file” and WP2004-11, NDS regularly produces EXFOR backup files since 2005-06-16. Technically it is implemented via EXFOR Relational database:



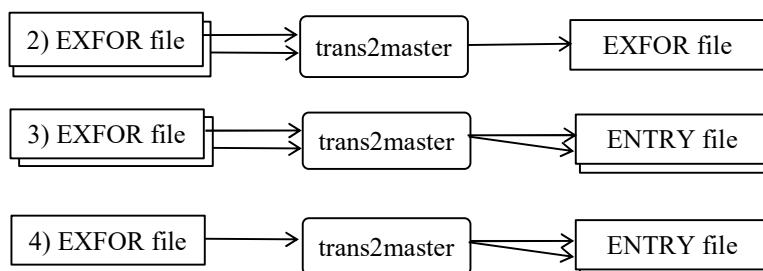
The task is to exclude the relational database (complex system) from above data flow, so that the final software should operate only with EXFOR in plain text files.

My solution: java code “trans2master” reads an old EXFOR Master/backup file, one or many TRANS files, and produces joined EXFOR file without intermediate storage of EXFOR files.



Program trans2master.java

- 1) operates via internal buffer and, working with full Master file having size ~1GB, requires additional memory in Java Virtual Machine (-Xmx4000M to set maximum Java heap size)
- 2) can be used for merging any EXFOR files (i.e. without input Master file)
- 3) can store Entries from the internal buffer by files instead of output to joined EXFOR file
- 4) can split an EXFOR file to single Entry files in directory structure without internal buffer
- 5) has options to correct/setup N2, N3 and file-header if necessary (see “help” in Appendix)



Tests and distribution

The program was tested in all regimes with different data on Windows, Linux, MacOS. Two tests included to distribution are prepared to exactly reproduce (byte to byte) next EXFOR backup file from previous (backup files are downloaded from EXFOR backup area).

Test-1: EXFOR-2023-04-29.bck +trans.c222 →EXFOR-2023-05-15.new

Test-2: EXFOR-2023-05-15.bck +trans.2313 +trans.2314 +trans.o093 +trans.o094
→EXFOR-2023-05-23.new

The tests (shell and bat scripts) calling trans2master also include comparison of new and old backup files by programs “diff” on Linux/MacOS and “FC” on Windows.

Required system environment: Linux/MacOS: java, unzip, unix2dos; Windows: java, 7z.

The package available for downloading: <https://github.com/vzerkin/EXFOR-trans2master> includes source code, test scripts and data. Note: due to GitHub file size limit (100MiB), backup EXFOR ZIP files (~ 220MiB each) are stored divided into 3 files. Script to unpack backup files are provided.

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Program trans2master for standalone maintenance of local EXFOR backup/master file.
 Help: input/output files, parameters, examples.

```
$ java -cp x4master.jar trans2master
```

```
+-----+
| Update EXFOR Master file by TRANS files. |
|   Program trans2master, ver.2023-08-14   |
|       by V.Zerkin, IAEA, Vienna, 2023   |
+-----+
```

Purpose.

To be used for standalone maintenance of EXFOR Master file implementing procedure of EXFOR Master file updates:

- read EXFOR file (Backup/Master or any other) into buffer;
- read TRANS file(s) and updates Entries in the buffer;
- save content of buffer to new EXFOR Master file.

Run:

```
$ java [flags] trans2master [-option] {[-option]} ...
```

Options:

settings applied to input files:

```
-add19      add 19 (when missing) to N2 for ENTRY/SUBENT
-n3set:N3   set N3 in ENTRY/SUBENT: date of update
-n3clean    correct N3 removing extra symbols
```

input files:

```
-i:filename read initial EXFOR Master file into buffer
-t:filename read EXFOR TRANS file, update buffer
```

settings for output:

```
-order      add N3=0 to END* lines, to be compatible with ORDER
-wide       add to EXFOR file right column (default: cut after 66-col.)
-h:N0,N1,...,N5 set Header-line in output file
```

output:

```
-o:filename write buffer to new EXFOR Master file
-od:dir     write buffer to dir/1/123/ by one file for ENTRY
```

output:

```
-split:file:dir split EXFOR file by Entries and save in dir/1/123/12345.x4
```

Examples:

1) load Master file, update by Trans-file(s), write new Master file

```
$ java -Xmx4000M -cp x4master.jar trans2master ^
-i:EXFOR-2023-04-29.bck ^
-n3set:20230515 -t:trans.c222 ^
-h:REQUEST,1001,20230515,172831,20230515,3 ^
-o:EXFOR-2023-05-15.new
```

2) merge EXFOR files, write to new EXFOR file

```
$ java -cp x4master.jar trans2master -t:trans.3208 -t:trans.e137 -o:new.x4
```

3) merge EXFOR files, save Entry files to output sub-directories

```
$ java -cp x4master.jar trans2master -t:trans.3208 -t:trans.e137 -wide -od:X4all/
```

4) split EXFOR file into sub-directories

```
$ java -cp x4master.jar trans2master -split:trans.3208:x4all
```

```
$
```