Documentation
for
shef_decode_pro, OB4 release
September 12, 2004

1.0   General Information

The shef_decode_pro program posts data to the "processed" data value tables. This program is run by oper as a background process and is constantly monitoring the /rfc_arc_data/q/processed directory for incoming messages. These incoming SHEF messages can come from various sources, however, the primary source are the level 1 processors run by oper's cron. The application is written in Fortran and esql/C.

1.1   Design Considerations

There have been numerous reported problems with the version 1 release of the archive SHEF decoders.   After reviewing the problems and possible solutions at the Nov 17-18, 2003 RAXUM team meeting, the team recommended that the archive SHEF decoders be rewritten using the national operational (IHFS) SHEF decoder as the starting point. A natural product of this change would be log output which is more consistent with that produced by the IHFS decoder, a feature which many RFCs desired.

This recommendation was reviewed by OHD management in January 2004. A "re-design" review session conference call in early February produced the following decisions:

- ➢ there will continue to be two RFC archive SHEF decoders (raw and processed),
- ➢ both decoders will use the same parser as the IHFS SHEF decoder,
- ➢ the format of the log files (daily and product) will be changed to be similar to the log files of the IHFS SHEF decoder, and
- ➢ the incoming directory for the shef_decode_raw will remain on the ds and be mounted to the rax, while the shef_decode_pro incoming directory will remain on the rax with no mount back to the ds.

1.2   Enhancements/Bug Fixes/Changes

Build OB4

Enhancements
See section 1.1 about the changes.

Bug Fixes
The following bug reports should be addressed by this new version of the application:
- ➢ r1-6 -- Both the shef_decode_raw and shef_decode_pro programs

end unexpectedly.

Changes
- changes in apps_defaults tokens
- changed from using the inputparm file to the SHEFPARM file for the definitions of valid SHEF pedrsep codes
- eliminated the cfg file and and command line options feature
- the start and stop scripts were modified

1.3   Known Limitations/Bugs

The OB4 release <u>will not</u> address the problems described by the following bug reports:
- ❖ R1-19: The shefdecoder(s) need to be able to write to ALL the SHEF data value tables.   The limitation in the version 1 release is not acceptable... need to ensure these tables are written to: commentvalue, pemrsep, pempsep, pehfsep and peqfsep.
- ❖ R1-24: Discovered in May 2004, the shefdecoders, raw and processed, do not enforce the SHEF revision flag.

Due to a change in programmers in mid-development of this program, there are a couple of additional limitations/bugs. These limitations/bugs will be taken care of in next software release. The limitations/bugs are:
- ❖ When starting the shef_decode_pro application a file called fort.##########, where ######### is some number, appears in the /rfc_arc/bin directory with a one line entry.
- ❖ The program will post nearly everything that is passed to it.   No checking of the location or ingestfilters tables is currently done.   The only checks are on the SHEF duration code and the SHEF type code. SHEF duration codes of I, H, Q and D are currently handled, and SHEF type code must be P or 1 thru 9.

2.0   Configuration Information

2.1   Apps_defaults Tokens

An excerpt from the .Apps_defaults file follows. This list shows the tokens that are used by this SHEF decoder.

```
adb_name       : adb_ob4rha    # archive database name
adb_server     : adbs          # archive server name
adb_dir        : /rfc_arc                   # Base RFC Archive Directory
adb_pro_que    : /rfc_arc_data/q/processed/  # pathname for processed q input
                                            # directory
adb_bin_dir    : $(adb_dir)/bin             # pathname for the bin directory
adb_cfg_dir    : $(adb_dir)/cfg             # pathname for the config
                                            # directory
adb_lib_dir    : $(adb_dir)/lib             # pathname for the lib directory
adb_logs_dir   : $(adb_dir)/logs    # pathname for the logs directory
```

```
adb_scripts_dir: $(adb_dir)/scripts          # pathname for the scripts
                                             # directory
adb_shef_winpast_pro   : 9999    # number of days in past to post data
adb_shef_winfuture_pro : 9999    # number of minutes in future to post obs data
shefdecode_rax_userid  : oper    # controlling UNIX user
adb_shefdecode_input   : $(adb_cfg_dir)/decoders  # RAX SHEF parameter file
                                             # location
adb_shef_pro_logs_dir  : $(adb_logs_dir)/decoder/processed/logs
                         # pathname for the daily logs directory
adb_shef_pro_err_dir   : $(adb_logs_dir)/decoder/processed/err
                         # pathname for the product logs directory
adb_shef_pro_keeperror : IF_ERROR          # keep files (=ALWAYS) or only
                                             # when errors occur (=IF_ERROR)
```

2.2   SHEFPARM File

This decoder uses the same SHEFPARM file as the IHFS SHEF decoder. This file is located on the rax in the /rfc_arc/cfg/decoders directory.

2.3   "Housecleaning" Requirements

Ensure that the purge_files script is housecleaning the directories defined by the apps_defaults tokens *adb_shef_pro_err_dir* and *adb_shef_pro_logs_dir*

3.0   User How-To

3.1   Start and Stop Scripts

Start and stop scripts have been provided to the user. These scripts use a similar concept as the start and stop scripts for the IHFS SHEF decoder. These scripts can be found in the directory /rfc_arc/scripts/decoders and are called:

> start_processed_decoder
> stop_processed_decoder

3.2   Parsing Errors/Warnings

The parsing portion of the shef_decode_pro program now uses the same parser as the IHFS SHEF decoder. The possible parsing warnings/errors are as follows:

1.   not used
2.   Two digits are required in date or time group
3.   An expected parameter code is missing
4.   File read error while accessing data file
5.   No dot in column 1 when looking for new message
6.   Dot found but not in column 1 of new message
7.   Unknown message type, looking for .A, .B, or .E
8.   Bad char in message type format (or missing blank delimiter)
9.   Last message format was different from this continuation messg
10.   Last message was NOT a revision unlike this continuation messg
11.   Last message had an error so cannot continue

12.	No positional data or no blank before it
13.	Bad character in station id
14.	Station id has more than 8 characters
15.	Bad number in positional data date group
16.	Incorrect number in date group
17.	Incorrect number in time group
18.	Missing blank char in positional data
19.	Bad creation date
20.	Bad date code letter after the character "D"
21.	Unknown data qualifier (need E,F,R,Q,T,S,V or other additions)
22.	Unknown data units code (need S or E)
23.	Unknown duration code (need Y,M,D,H,N,S,Z and others)
24.	Bad 2-digit number following duration code
25.	Unknown time interval code (need Y,M,D,H,N,S,E)
26.	Bad 2-digit number following time interval code
27.	Bad character after "DR" (relative date code)
28.	Bad 1- or 2-digit number in relative date code
29.	Bad character in parameter code
30.	Bad parameter code calls for send code
31.	Trace for code other than PP, PC, PY, SD, SF, SW
32.	Variable duration not defined
33.	Bad character where delimiter is expected
34.	Non-existent value for given type and source parameter code
35.	ZULU, DR, or DI has send code QY, PY, or HY
36.	Forecast data given without creation date
37.	No value given after parameter code and before slash or eol
38.	Explicit date for codes DRE or DIE is not the end-of-month
39.	Year not in good range (1753-2199)
40.	Exceeded limit of data items
41.	Too many data items for given .B format
42.	Not enough data items for given .B format
43.	Cannot adjust forecast date to Zulu time
44.	Time between 0201 & 0259 on day changing from stnd to daylight
45.	No time increment specified (use DI code)
46.	No ".END" message for previous ".B" format
47.	ID requires 3 to 8 characters
48.	For dayl savgs time, check Apr or Oct for 1976 thru 2040 only
49.	Bad character in the message
50.	Missing parameter code
51.	Bad value chars (or missing delimiter), data may be lost
52.	Bad chars in data value field
53.	"?" not accepted, use "M" (or change program)
54.	Parameter code is too long or too short
55.	Missing delimiter between data type fields
56.	Missing delimiter after data type field
57.	Should use "/" instead of blank for delimiter
58.	Parm codes PP and PC require decimal value
59.	Abort, cannot read "shefparm" file correctly
60.	Non-existent value for given duration parameter code
61.	Non-existent value for given extremum parameter code
62.	Non-existent value for given conversion factor parameter code
63.	Non-existent value for given probability parameter code
64.	Parameter code too short or field misinterpreted as param-code
65.	Comma not allowed in data field, data value is lost
66.	Date check for yr-mo-da shows bad date
67.	No data on line identified with a message type format
68.	An unexpected ".END" message was encountered

69.   BUMMER!!! Maximum number of errors reached, abort message
70.   Cannot output to binary shefpars file
71.   Cannot access "PE conversion factors" from the "shefparm" file
72.   Cannot access "send codes" from the "shefparm" file
73.   Cannot access "duration codes" from the "shefparm" file
74.   Cannot access "type/source codes" from the "shefparm" file
75.   Cannot access "extremum codes" from the "shefparm" file
76.   Cannot access "probability codes" from the "shefparm" file
77.   Cannot read "SHEFPARM" file!!!!!
78.   Bad character in data value, value is lost
79.   Julian day should be written with 3 digits
80.   Too many digits in date group!
81.   Too many characters in quotes
82.   Data line found before completing .B format line(s)
83.   Missing slash delimiter or bad time zone code
84.   Too many chars in qualifier code, data value is lost
85.   Bad data qualifier, rest of format is lost
86.   Retained comment found without a data value, comment is lost
87.   Unexpected slash found after parameter code, before data value
88.   Cannot access "qualifier codes" from the "shefparm" file
89.   not used
90.   Unknown error number given

3.3   Posting Warning/Error Examples

Posting errors are limited to providing the Informix and ISAM error information in the daily log file. Miscellaneous information may be found in the pro.out and/or pro.err log files. These files are located in the directory /rfc_arc/logs/decoder/processed/logs and contain the information that used to be redirected into the nohup.out file.

4.0   Daily Log File

The shef_decode_pro program generates a daily log file. The format of this log file is based on the IHFS SHEF decoder's daily log file as much as possible.   An excerpt from a daily log file follows.

```
 ----------
Processing file: ppq.000119; at 2004-05-10 00:01:28
    Header productId: KRFCPC2PPQ; timeZ= 2004-05-10 00:01
    LogFile: KRFCPC2PPQ.0510.000128
Parsing data.
    Parse errs/warn=   0 /   0
Posting data.
   160 records processed
Total PEHPSEP:     0  Ins:    0  Upd:    0  NoIns:    0  NoUpd:    0
Total PEDPSEP:     0  Ins:    0  Upd:    0  NoIns:    0  NoUpd:    0
Total PEQPSEP:    39  Ins:    9  Upd:   30  NoIns:    0  NoUpd:    0
Total Outside Window:    0
Net Total:       39
PEHPSEP Unk Location:    0   Unk Ingestfilter:    0
PEDPSEP Unk Location:    0   Unk Ingestfilter:    0
PEQPSEP Unk Location:    0   Unk Ingestfilter:    0
End time (elapsed parse,post): 2004-05-10 00:01:29 (00:00, 00:01)
```

```
----------
Processing file: pph.000119; at 2004-05-10 00:01:29
    Header productId: KRFCPC2PPH; timeZ= 2004-05-10 00:01
    LogFile: KRFCPC2PPH.0510.000129
Parsing data.
    Parse errs/warn=   0 /   0
Posting data.
   864 records processed
Total PEHPSEP:     35  Ins:     8  Upd:    27  NoIns:     0  NoUpd:     0
Total PEDPSEP:      0  Ins:     0  Upd:     0  NoIns:     0  NoUpd:     0
Total PEQPSEP:      0  Ins:     0  Upd:     0  NoIns:     0  NoUpd:     0
Total Outside Window:     0
Net Total:        35
PEHPSEP Unk Location:      0   Unk Ingestfilter:     0
PEDPSEP Unk Location:      0   Unk Ingestfilter:     0
PEQPSEP Unk Location:      0   Unk Ingestfilter:     0
End time (elapsed parse,post): 2004-05-10 00:01:29 (00:00, 00:00)
----------
Processing file: ppd.000119; at 2004-05-10 00:01:29
    Header productId: KRFCPC2PPD; timeZ= 2004-05-10 00:01
    LogFile: KRFCPC2PPD.0510.000129
Parsing data.
    Parse errs/warn=   0 /   0
Posting data.
    40 records processed
Total PEHPSEP:      0  Ins:     0  Upd:     0  NoIns:     0  NoUpd:     0
Total PEDPSEP:      9  Ins:     0  Upd:     9  NoIns:     0  NoUpd:     0
Total PEQPSEP:      0  Ins:     0  Upd:     0  NoIns:     0  NoUpd:     0
Total Outside Window:     0
Net Total:         9
PEHPSEP Unk Location:      0   Unk Ingestfilter:     0
PEDPSEP Unk Location:      0   Unk Ingestfilter:     0
PEQPSEP Unk Location:      0   Unk Ingestfilter:     0
End time (elapsed parse,post): 2004-05-10 00:01:30 (00:00, 00:01)
----------
```

5.0   Message Error Files

The shef_decode_pro program generates message error files. The format of these files
is based on the IHFS SHEF decoder's message error files as much as possible. An
excerpt from a daily log file is shown below.

```
 SRUS55 KRFC 281843
 HG2HG
 .E2  627.280S/ 627.360S/ 627.440S/ 627.520S/ 627.580S/ 627.660S/ 627.700S/
    ?
  ** ERROR  9 ** Last message format was different from this continuation messg
 .E3  627.750S/ 627.820S/ 627.870S/ 627.910S/ 627.940S/ 627.980S
    ?
  ** ERROR 11 ** Last message had an error so cannot continue
 .E SYDP1    20040427 DH00/HPI1GZZ/DIH1/ 628.000S/ 628.030S/ 628.050S/ 628.070S/
 .E1  628.090S/ 628.110S/ 628.120S/ 628.130S/ 628.140S/ 628.140S/ 628.150S/
 .E2  628.160S/ 628.160S/ 628.180S/ 628.210S/ 628.240S/ 628.250S/ 628.280S/
 .E3  628.320S/ 628.360S/ 628.430S/ 628.390S/ 628.440S/ 628.450S
 .E SYDP1    20040428 DH00/HPI1GZZ/DIH1/ 628.470S/ 628.490S/ 628.500S/ 628.510S/
 .E1  628.520S/ 628.530S/ 628.550S/ 628.560S/ 628.570S/ 628.590S/ 628.600S/
 .E2  628.610S/ 628.620S/ 628.600S/ 628.620S/ 628.640S/ 628.670S/ 628.680S/
```

```
.E3  628.700S/-9999.000 /-9999.000 /-9999.000 /-9999.000 /-9999.000
.E STVP1     20040426 DH00/HPI1GZZ/DIH1/ 921.900S/ 921.940S/ 921.980S/ 922.020S/
.E1  922.070S/ 922.120S/ 922.190S/ 922.260S/ 922.360S/ 922.480S/ 922.630S/
.E2  922.750S/ 922.790S/ 922.860S/ 922.950S/ 923.060S/ 923.180S/ 923.010S/
.E3  922.870S/ 922.730S/ 922.610S/ 922.500S/ 922.410S/ 922.350S
.E STVP1     20040427 DH00/HPI1GZZ/DIH1/ 922.290S/ 922.250S/ 922.230S/ 922.210S/
.E1  922.220S/ 922.230S/ 922.250S/ 922.280S/ 922.310S/ 922.350S/ 922.390S/
.E2  922.440S/ 922.480S/ 922.520S/ 922.570S/ 922.600S/ 922.640S/ 922.410S/
.E3  922.180S/ 921.930S/ 921.690S/ 921.440S/ 921.190S/ 920.940S
.E STVP1     20040428 DH00/HPI1GZZ/DIH1/ 921.160S/ 921.580S/ 921.810S/ 922.030S/
.E1  922.250S/ 922.440S/ 922.610S/ 922.780S/ 922.930S/ 923.070S/ 923.200S/
.E2  923.160S/ 922.910S/ 922.700S/ 922.490S/ 922.270S/ 922.040S/ 921.800S/
.E3  921.550S/-9999.000 /-9999.000 /-9999.000 /-9999.000 /-9999.000
.E STIP1     20040426 DH00/HPI1GZZ/DIH1/1574.080S/1574.080S/1574.090S/1574.090S/
.E1 1574.100S/1574.110S/1574.120S/1574.130S/1574.160S/1574.190S/1574.220S/
.E2 1574.260S/1574.320S/1574.390S/1574.490S/1574.600S/1574.740S/1574.880S/
.E3 1575.030S/1575.180S/1575.320S/1575.460S/1575.600S/1575.720S
.E STIP1     20040427 DH00/HPI1GZZ/DIH1/1575.850S/1575.960S/1576.080S/1576.180S/
.E1 1576.280S/1576.380S/1576.470S/1576.550S/1576.630S/1576.710S/1576.780S/
.E2 1576.840S/1576.880S/1576.870S/1576.870S/1576.860S/1576.840S/1576.820S/
.E3 1576.800S/1576.770S/1576.750S/1576.720S/1576.690S/1576.660S
.E STIP1     20040428 DH00/HPI1GZZ/DIH1/1576.620S/1576.590S/1576.550S/1576.520S/
.E1 1576.480S/1576.440S/1576.410S/1576.370S/1576.330S/1576.290S/1576.250S/
.E2 1576.210S/1576.170S/1576.130S/1576.090S/1576.050S/1576.010S/1575.970S/
.E3 1575.920S/-9999.000 /-9999.000 /-9999.000 /-9999.000 /-9999.000
.E RTDP1     20040426 DH00/HPI1GZZ/DIH1/ 786.340S/ 786.370S/ 786.360S/ 786.350S/
.E1  786.350S/ 786.330S/ 786.330S/ 786.350S/ 786.390S/ 786.400S/ 786.400S/
.E2  786.380S/ 786.370S/ 786.370S/ 786.480S/ 786.450S/ 786.490S/ 786.520S/
.E3  786.490S/ 786.560S/ 786.540S/ 786.590S/ 786.570S/ 786.600S
.E RTDP1     20040427 DH00/HPI1GZZ/DIH1/ 786.610S/ 786.600S/ 786.620S/ 786.610S/
.E1  786.630S/ 786.650S/ 786.670S/ 786.720S/ 786.760S/ 786.780S/ 786.820S/
.E2  786.830S/ 786.850S/ 786.840S/ 786.830S/ 786.810S/ 786.810S/ 786.810S/
.E3  786.770S/ 786.810S/ 786.850S/ 786.720S/ 786.790S/ 786.740S
.E RTDP1     20040428 DH00/HPI1GZZ/DIH1/ 786.750S/ 786.750S/ 786.710S/ 786.760S/
.E1  786.720S/ 786.740S/ 786.740S/ 786.730S/ 786.760S/ 786.770S/ 786.770S/
.E2  786.770S/ 786.770S/ 786.780S/ 786.760S/ 786.780S/ 786.780S/ 786.760S/
.E3  786.770S/-9999.000 /-9999.000 /-9999.000 /-9999.000 /-9999.000


    NUMBER OF WARNINGS  ....        0
    NUMBER OF ERRORS  ......        2

    TOTAL NUMBER OF LINES ..       50
    (parsing routines: ob4-r25)
   264 records processed
Total PEHPSEP:      0  Ins:    0  Upd:    0  NoIns:    0  NoUpd:    0
Total PEDPSEP:      0  Ins:    0  Upd:    0  NoIns:    0  NoUpd:    0
Total PEQPSEP:      0  Ins:    0  Upd:    0  NoIns:    0  NoUpd:    0
Total Outside Window:     0
Net Total:       0
PEHPSEP Unk Location:     0   Unk Ingestfilter:     0
PEDPSEP Unk Location:     0   Unk Ingestfilter:     0
PEQPSEP Unk Location:     0   Unk Ingestfilter:     0
```

6.0   Posting Summary Information

The posting summary information that appears in both the daily log file and the messages error files can be broken into three parts: part 1) status of posting to each of the various "processed" data value tables, part 2) miscellaneous totals, and part 3) general summary information indicating why a record was not posted.

```
Part 1     Total PEHPSEP:      0  Ins:    0  Upd:    0  NoIns:    0  NoUpd:    0
           Total PEDPSEP:      0  Ins:    0  Upd:    0  NoIns:    0  NoUpd:    0
           Total PEQPSEP:      0  Ins:    0  Upd:    0  NoIns:    0  NoUpd:    0


Part 2     Total Outside Window:    0
           Net Total:       0


Part 3     PEHPSEP Unk Location:      0   Unk Ingestfilter:     0
           PEDPSEP Unk Location:      0   Unk Ingestfilter:     0
           PEQPSEP Unk Location:      0   Unk Ingestfilter:     0
```

Part 1

This part currently consists of 3 lines, one line for each of the tables the shef_decode_pro program currently can post to. Each row consists of 5 values.

Column 1 indicates the total number of rows inserted and/or updated in this table.
Column 2 indicates the total number of rows inserted.
Column 3 indicates the total number of rows updated.
Column 4 indicates the total number of rows where an insert was attempted but failed.
Column 5 indicates the total number of rows where an update was attempted but failed.
Columns 4 and 5 should always have zero totals.

Part 2

This part currently consists of 2 lines.

Line 1 indicates the number of records where the observation time was outside the window defined by the apps_defaults tokens *adb_shef_winpast_pro & adb_shef_winfuture_pro.*
Line 2 indicates the total number of records posted for all the tables.

Part 3

Currently the shef_decode_pro program does not use this section. See section 1.3 about known limitations.

7.0   Troubleshooting Information

Check the pro.out, pro.err, daily log and message error files.   If the user cannot determine the source of the problem by viewing these files, contact the RFC Support Group for assistance.

8.0   Maintenance Information

Originating Programmer/Office: Toth, Monica
                                  Herr, Hank
                                  NWS/OHD/HL
                                  Silver Spring, MD

Maintenance programmer/Office: OHD/HL
                                  Silver Spring, MD

Documentation: Meyer, Juliann
                                  Missouri Basin River Forecast Center
                                  Pleasant Hill, MO

9.0   References

NWS Manual 10-942 Standard Hydrometeorological Exchange Format (SHEF) Manual

RFC Archive DB Team Request for Change to SHEF submitted February 28, 2002.

Website with information on SHEF and the IHFS shefdecoder application
http://www.nws.noaa.gov/os/whfs/shef.shtml