QEFS — Working with the EFS partition of a modem

The program QEFS is designed for processing the contents of the EFS partition. This partition stores files that are used by the DSP cores of the modem, as well as NVRAM. The partition has a hierarchical file structure that closely resembles the POSIX standard. Files can be regular files, directories, or special files (symbolic links and pseudo-files). Each file has attributes similar to UNIX attributes (rwx). With the qefs program, you can manipulate individual files (read, write, view, delete), and you can also back up the entire EFS partition.

Viewing the directory tree - key: -ld

In this mode, the directory tree is displayed. Regular files are not included in the list. The command format is as follows:

./qefs -ld [-f] [<path>]

The -f key allows the display of the full path to each directory. This is useful in cases where, for example, the full path to a directory needs to be copied to the clipboard and used in subsequent commands. The tree is displayed starting from the specified path in the command, or from the root if no path is specified.
For example:

```
$ ./qefs -ld nv/

item_files/
   CoreCpu/
      CoreAll/
         Startup/
      Default/
         Fixed/
         Startup/
         qdsp_classic/
   Thin_UI/
   conf/
   gsm/
      gl1/
```

The same with the -f key:

```
$ ./qefs -ld -f nv/

nv/item_files/
   nv/item_files/CoreCpu/
      nv/item_files/CoreCpu/CoreAll/
         nv/item_files/CoreCpu/CoreAll/Startup/
      nv/item_files/CoreCpu/Default/
         nv/item_files/CoreCpu/Default/Fixed/
         nv/item_files/CoreCpu/Default/Startup/
         nv/item_files/CoreCpu/Default/qdsp_classic/
   nv/item_files/Thin_UI/
   nv/item_files/conf/
   nv/item_files/gsm/
      nv/item_files/gsm/gl1/
```

Each subsequent level of directory nesting is displayed on the screen with an indentation, thus creating a list in the form of a tree.

Viewing the file tree - key -lt

This mode is similar to the previous one, but it includes not only directories but also regular files in the tree. The command line format is also similar to the previous option (but instead of the -ld key, you specify -lt). For example:

```
$ ./qefs -lt nv/

item_files/
   CoreCpu/
      CoreAll/
         Startup/
            Algorithm.txt
            LogSize.uint
      Default/
         Fixed/
            MIPS.uint
```

```
         Startup/
            AVSEnable.uint
            Algorithm.txt
            LogSize.uint
         qdsp_classic/
            HighThresholdBusyPct.uint
            SamplePeriod.uint
   Thin_UI/
      enable_thin_ui_cfg
   conf/
      cgps_me.conf
```

At the end of directory names, a '/' sign is displayed to distinguish directory names from file names.

Viewing a simple list of files - the -ll key

In this mode, a simple list of files in the specified directory is displayed. The command format is:

./qefs -ll [<path>]

If the path is not specified, the contents of the root directory are displayed. For example:

```
$ ./qefs -ll

/.efs_private/
/AUTORUN.FLG
/CGPS_ME/
/CGPS_PE/
/CGPS_SM/
/NODOWNLOAD.FLG
/SUPL/
/UimEfsAPDULog.Txt
/cert/
/client-cert/
/client-key/
/config
```

As in the previous cases, a '/' sign is displayed at the end of directory names to distinguish directory names from file names.

Viewing a complete list of files - the -lf key

In this mode, complete information about each file is displayed, including attributes, size, and creation date. The command format is:

./qefs -lf [-r] [<path>]

The -r key makes the program display not only the contents of the specified directory but also all the subdirectories within it. If the path is not specified, the contents of the root directory are displayed. For example:

```
 ./qefs -lf nv/item_files/conf

 *** Folder nv/item_files/conf ***
-rwxrwxrwx  0      1375 ---------------- cgps_me.conf
-rwxrwxrwx  0       212 ---------------- cgps_pdcomms.conf
Irwxrwxrwx 15        41 01-Jan-70 03:00 w_idle_mode.conf
-rwxrwxrwx  0      3720 ---------------- wcdma_csg_efs_1.conf
-rwxrwxrwx  0      3720 ---------------- wcdma_csg_efs_2.conf
-rwxrwxrwx  0      3720 ---------------- wcdma_csg_efs_3.conf
-rwxrwxrwx  0      3720 ---------------- wcdma_csg_efs_4.conf
-rwxrwxrwx  0      3720 ---------------- wcdma_csg_efs_5.conf
-rwxrwxrwx  0        54 ---------------- wcdma_csg_efs_db.conf
-rwxrwxrwx  0      1170 ---------------- wcdma_rrc_external.conf
Irwxrwxrwx 15        43 01-Jan-70 03:00 wl1_atuner.conf
-rwxrwxrwx  0       171 ---------------- wl1_cme.conf
Irwxrwxrwx 15        41 01-Jan-70 03:00 wl1_dc_w2l_mode.conf
```

If the file's creation date is incorrectly recorded in the system, it won't be displayed (replaced by a '-'). The file size is displayed in bytes.

Viewing the contents of a file as text - the -tt key

You can view the contents of any available file in text format using the -tt key. The command format is:

./qefs -tt <filename>

The filename is the full path to the file you want to view, starting from the root (you can obtain it using the -f key in the -lt command). For example:

```
$ ./qefs -tt /mcfg_debug.log

:Log:Modem Config task-START
:Err:mcfg_efs_read_config_map: Unable to open MCFG Image file (1002)
:Log:mcfg_efs_read_factory_config_map: factory config doesn't exist
:Err:mcfg_efs_read_config_map: Unable to open MCFG Image file (1002)
:Log:mcfg_efs_read_factory_config_map: factory config doesn't exist
:Log:mcfg_efs_print_map: type 0 active 0 pending 0
:Log:mcfg_efs_print_map: type 1 active 0 pending 0
:Log:====  Starting modem_cfg_process ====
:Log:modem_cfg_load_and_auth_mcfg 5 - mcfg_load_status=1
:Err:mcfg_load_and_auth_seg fail for cfg type 0, status = 1
:Log:modem_cfg_load_and_auth_mcfg 5 - mcfg_load_status=1
:Err:mcfg_load_and_auth_seg fail for cfg type 1, status = 1
:Err:Modem Config Processing Error 0x1
:Log:Modem Config Processing -DONE
```

Please note that when attempting to view non-text files in this mode, undefined garbage characters may be displayed on the screen, which could potentially disrupt the console's operation (due to the interpretation of this garbage as control characters).

Viewing the contents of a file as a dump - the -td key

Unlike the previous mode, with the -td command, you can view the contents of absolutely any file. The file is displayed on the screen in the form of a canonical dump (hex + ascii). For example:

```
$ ./qefs -td /config
00000000: 12 34 56 78 7f 01 00 00 bf 4f 00 00 3c d9 5c 78  *.4Vx^?....O..<.\x*
00000010: 01 00 00 00 70 01 00 00 20 08 08 18 03 00 00 00  *....p... .......*
00000020: 42 44 5f 4d 54 53 38 33 30 46 54 56 31 2e 30 2e  *BD_MTS830FTV1.0.*
00000030: 30 42 30 31 00 00 00 00 00 00 00 00 00 00 00 00  *0B01............*
00000040: 38 33 30 46 54 00 00 00 00 00 00 00 00 00 00 00  *830FT...........*
00000050: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  *................*
00000060: 38 33 30 46 54 2d 31 2e 30 2e 30 00 00 00 00 00  *830FT-1.0.0.....*
00000070: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  *................*
00000080: 5a 54 45 20 43 4f 52 50 4f 52 41 54 49 4f 4e 00  *ZTE CORPORATION.*
00000090: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  *................*
000000a0: 50 43 57 5f 4d 54 53 52 55 53 48 49 56 31 2e 30  *PCW_MTSRUSHIV1.0*
000000b0: 2e 30 42 30 32 00 00 00 00 00 00 00 00 00 00 00  *.0B02...........*
```

Reading a file from EFS to a local file - the -gf key.

This command reads the specified file from EFS and saves a local copy of it in the current directory. The format of the command is as follows:

./qefs -gf <filename>

filename — where filename is the full path to the file from the root. As a result, a copy of this file will be saved in the current directory. For example:

```
 $ ./qefs -gf /config
 $ ls -l config
-rw-rw-r-- 1 forth32 forth32 20415 дек.   1 08:02 config
```

Writing a local file to EFS - the -wf key

The -wf command writes a local file to the modem's EFS at the specified path. The command format is as follows:

./qefs -wf <localfile> <path>

localfile — where localfile is the path to the local file and its name. The file can be located anywhere in the file system.
Path — the path in EFS to save the file. The file name will be similar to the local name. For example:

```
 $ ./qefs -wf m823x/config /
```

In this example, the local file 823x/config will be written to the root of EFS under the name config.

Deleting a file from EFS - the -ef key

The -ef command deletes the specified file from the EFS partition. The command format is as follows:

./qefs -ef <filename>

filename — where filename is the full path and name of the file to be deleted. For example:

```
$ ./qefs -ef config
```

This command deletes the config file from the root of the EFS file system.

Creating an EFS backup - the -be key

Using the -be key, you can create a file that contains an exact backup of the EFS partition. The resulting efs.mbn file has the same format as a similar file obtained using QPST (in EFS backup mode). Files efs.mbn included in firmware update packages also have the same format. You can write the file back to the modem using the xNPRG loader-programmer in the partition write mode, controlled by the qwflash utility or QPST.

In principle, the best results for preserving EFS can be achieved by taking an exact image of the EFS partition using the qrflash utility (such an image can be written back using the qwdirect utility). Nevertheless, the efs.mbn file is Qualcomm's official means of preserving and restoring EFS, so support for it is included in this utility.

Command format:

./qefs -be [-o file]

With the -o key, you can specify an output file name different from efs.mbn.