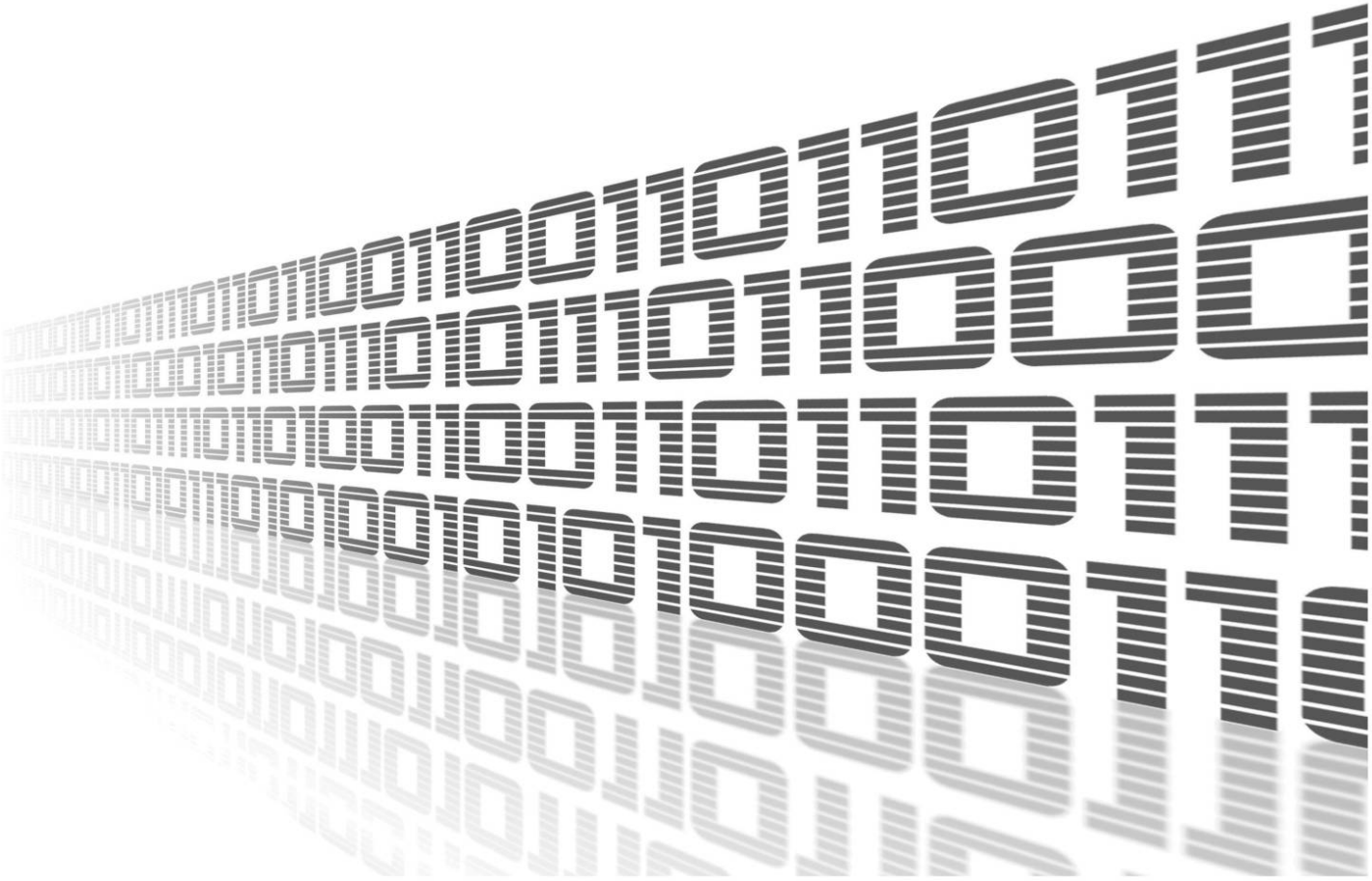
ADVANTECH

RouterApp

Ext4_tools



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Used symbols

Danger – Information regarding user safety or potential damage to the router.

Attention – Problems that can arise in specific situations.

Information – Useful tips or information of special interest.

Example – Example of function, command or script.

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1. Changelog

1.1 Ext4_tools Changelog

v1.0.0 (2016-03-01)

- First release
- Compatible FW 5.3.4+ only

v1.0.1 (2019-01-02)

- Added licenses information

v1.1.0 (2020-10-01)

- Updated CSS and HTML code to match firmware 6.2.0+

v1.2.0 (2021-03-15)

- Added dumpe2fs

2. Description of router app

This router app is compatible with **SmartFlex** and **SmartMotion** Advantech routers only and supported for FW of version **5.3.4** or newer.

Be careful when working with router's file systems. If the internal FLASH is formatted accidentally, the router will be no operable any more and service intervention will be required.

The *Ext4_tools* router app allows the router to create and check *ext3*, *ext2* and ***ext4*** file systems. This router app has no graphical user interface, all operations can be performed through the command line interface.

There are two new commands awailable within this module, **mke2fs** and **e2fsck** commands. Installation and usage of this module is described in following chapters.

3. Module installation

Module installation file can be downloaded from *Advantech* web pages under *Support&Downloads* section or obtained from your local sales representative eventually.

The easy way for installation of the module is to use the router's web cofiguration pages. Access the web configuration main page and navigate to *Router Apps* under *Customization* menu section, see the figure 1. Click on *Browse...* button and locate the installation file named *ext4_tools.v3.tgz*.

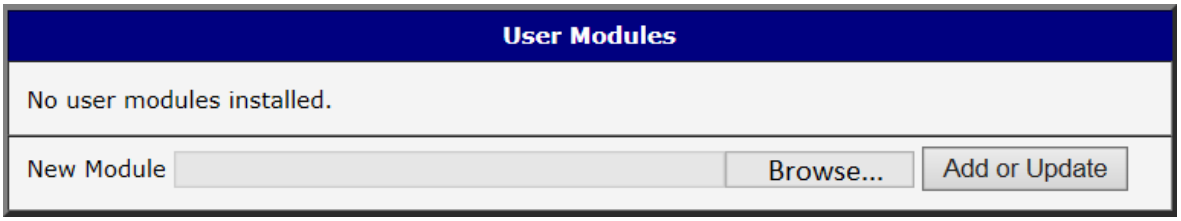

Figure 1: Module installation

To proceed with the installation click on *Add or Update* button. The module is now istalled and listed as *Ext2/3/4 Filesystems Utilities* module, as shown on figure 2.

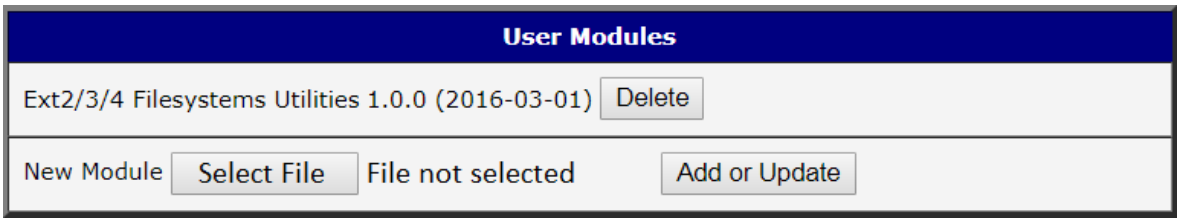

Figure 2: Module installed

4. Commands set usage

This chapter describes the usage of commands set for filesystems administration. **mount** and **umount** commands are pre-installed in the router, **mke2fs** and **e2fsck** commands were installed withing the *Ext4_tools* router app.

4.1 Filesystem creating

mke2fs command can be used to create a filesystem. It can create an ext2, ext3 or ext4 filesystem.

Synopsis:

```
mke2fs [-c|-l filename] [-b block-size] [-C cluster-size] [-i bytes-per-inode]
  [-I inode-size] [-J journal-options] [-G flex-group-size]
  [-N number-of-inodes] [-m reserved-blocks-percentage] [-o creator-os]
  [-g blocks-per-group] [-L volume-label] [-M last-mounted-directory]
  [-O feature[,...]]  [-r fs-revision] [-E extended-option[,...]]
  [-t fs-type] [-T usage-type ] [-U UUID] [-jnqvDFKSV] device [blocks-count]
```

Options:

Option	Description
`-b block-size`	Specify the size of blocks in bytes. Valid block-size values are 1024, 2048 and 4096 bytes per block.
`-c`	Check the device for bad blocks before creating the file system. If this option is specified twice, then a slower read-write test is used instead of a fast read-only test.
`-E extended-options`	Set extended options for the filesystem. Extended options are comma separated, and may take an argument using the equals ('=') sign. The following extended options are supported: ***stride=****stride-size* ***stripe-width=****stripe-width* ***resize=****max-online-resize* ***lazy_itable_init=*** *(0 to disable, 1 to enable)* ***test_fs*** *- using experimental kernel code* ***discard*** - discard blocks at mkfs time ***nodiscard*** - do not discard blocks at mkfs time
`-F`	Force mke2fs to create a filesystem, even if the specified device is not a partition on a block special device, or if other parameters do not make sense.
`-g blocks-per-group`	Specify the number of blocks in a block group. There is generally no reason for the user to ever set this parameter, as the default is optimal for the filesystem.

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Option	Description
`-G flex-group-size`	Specify the number of block groups that will be packed together to create a larger virtual block group (or flex_bg group) in an ext4 filesystem.
`-i bytes-per-inode`	Specify the bytesinode ratio. mke2fs creates an inode for every bytes-per-inode bytes of space on the disk. The larger the bytes-per-inode ratio, the fewer inodes will be created.
`-I inode-size`	Specify the size of each inode in bytes. mke2fs creates 256-byte inodes by default.
`-j`	Create the filesystem with an ext3 journal. If the -J option is not specified, the default journal parameters will be used to create an appropriately sized journal (given the size of the filesystem) stored within the filesystem.
`-J journal-options`	Create the ext3 journal using options specified on the command-line. Journal options are comma separated, and may take an argument using the equals sign ('='). The following journal options are supported: ***size=****journalsize* ***device=****externaljournal* ***mke2fs -O journal_dev*** - external-journal
`-K`	Keep, do not attempt to discard blocks at mkfs time.
`-l filename`	Read the bad blocks list from filename. Note that the block numbers in the bad block list must be generated using the same block size as used by mke2fs.
`-L volume-label`	Set the volume label for the filesystem to new-volume-label. The maximum length of the volume label is 16 bytes.
`-m reserved-blocks-percentage`	Specify the percentage of the filesystem blocks reserved for the super-user. This avoids fragmentation, and allows root-owned daemons, such as syslogd(8), to continue to function correctly after non-privileged processes are prevented from writing to the filesystem. The default percentage is 5%.
`-M last-mounted-directory`	Set the last mounted directory for the filesystem.
`-n`	Causes mke2fs to not actually create a filesystem, but display what it would do if it were to create a filesystem..
`-N number-of-inodes`	Overrides the default calculation of the number of inodes that should be reserved for the filesystem .
`-o creator-os`	Overrides the default value of the "creator operating system" field of the filesystem.
`-O feature[,...]`	Create a filesystem with the given features (filesystem options), overriding the default filesystem options.
`-q`	Quiet execution.
`-r fs-revision`	Set the filesystem revision for the new filesystem.

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Option	Description
`-S`	Write superblock and group descriptors only.
`-t fs-type`	Specify the filesystem type (i.e., ext2, ext3, ext4, etc.) that is to be created.
`-T usage-type`	Specify how the filesystem is going to be used, so that mke2fs can choose optimal filesystem parameters for that use.
`-U UUID`	Create the filesystem with the specified UUID..
`-v`	Verbose execution.
`-V`	Print the version number of mke2fs and exit.

Table 1: mke2fs options

For detailed description this command, visit Linux manual pages.

Examples:

Force to create a filesystem of ext4 type on device */dev/sda1*, which may be represented by an USB stick connected to the router.

```
mke2fs -F /dev/sda1 -t ext4
```

It is recommended not to do any filesystem operations on a mounted partition. But still you can force it to create a filesystem on in-use partition or mounted partition with option -F as shown in the example.

4.2 Device mounting

mount command can be used to mount a file system (on SD card, USB stick, etc.).

Synopsis:

```
mount [-afirw] [-t FSTYPE] [-O OPT] <DEVICE> <NODE> [ -o <option>, ...]
```

Options:

Flag	Description
`-a`	Mount all filesystems in fstab
`-f`	Dry run
`-i`	Don't run mount helper
`-r`	Read-only mount
`-w`	Read-write mount (default)
`-t FSTYPE`	Filesystem type
`-O OPT`	Mount only filesystems with option OPT (-a only)

Table 2: mount flags

Option	Description
`loop`	Ignored (loop devices are autodetected)
`[a]sync`	Writes are [a]synchronous
`[no]atime`	Disable/enable updates to inode access times
`[no]diratime`	Disable/enable atime updates to directories
`[no]relatime`	Disable/enable atime updates relative to modification time
`[no]dev`	(Dis)allow use of special device files
`[no]exec`	(Dis)allow use of executable files
`[no]suid`	(Dis)allow set-user-id-root programs
`[r]shared`	Convert [recursively] to a shared subtree
`[r]slave`	Convert [recursively] to a slave subtree
`[r]private`	Convert [recursively] to a private subtree
`[un]bindable`	Make mount point [un]able to be bind mounted
`bind`	Bind a directory to an additional location
`move`	Relocate an existing mount point
`remount`	Remount a mounted filesystem, changing its flags
`ro/rw`	Read-only/read-write mount

Table 3: mount options

For detailed description this command, visit Linux manual pages.

Examples:

Mount */dev/sda1* device, which can be represented by an USB flash stick connected to the router, to the directory */mnt/usb*. Make sure this destinatin directory exists.

```
mount -t vfat /dev/sda1 /mnt/usb
```

Note that the *-t* flag with the filesystem type is not mandatory. If the type is not specified, mount will try to guess the desired type.

4.3 Filesystem checking

e2fsck command is used to check the ext2, ext3 or ext4 file systems. Note that in general it is not safe to run e2fsck on mounted filesystems. The only exception is if the -n option is specified, and -c, -l, or -L options are not specified. However, even if it is safe to do so, the results printed by e2fsck are not valid if the filesystem is mounted.

Synopsis:

```
e2fsck [-pnycfv] [-C fd] [-b superblock] [-B blocksize]
  [-j external_journal] [-l|-L bad_blocks_file]
```

Options:

Option	Description
`-p`	Automatic repair (no questions)
`-n`	Make no changes to the filesystem
`-y`	Assume "yes" to all questions
`-c`	Check for bad blocks and add them to the badblock list
`-f`	Force checking even if filesystem is marked clean
`-v`	Be verbose
`-C fd`	This option causes e2fsck to write completion information to the specified file descriptor so that the progress of the filesystem check can be monitored
`-b superblock`	Use alternative superblock
`-B blocksize`	Force blocksize when looking for superblock
`-j external_journal`	Set location of the external journal
`-l bad_blocks_file`	Add to badblocks list
`-L bad_blocks_file`	Set badblocks list

Table 4: e2fsck options

For detailed description this command, visit Linux manual pages.

Examples:

Check for bad blocks on */dev/sda1* device.

```
mke2fs -c /dev/sda1
```

This will do a read-only test on the filesystem to make sure there are no bad blocks.

4.4 Device unmounting

umount command is used to manually unmount a mounted filesystem, informing the system to complete any pending read or write operations, and safely detaching it.

Synopsis:

```
umount [-arlfD] <FILESYSTEM>|<DIRECTORY>
```

Options:

Flag	Description
`-a`	Unmount all file systems
`-r`	Try to remount devices as read-only if mount is busy
`-l`	Lazy umount (detach filesystem)
`-f`	Force umount (i.e., unreachable NFS server)
`-D`	Don't free loop device even if it has been used

Table 5: umount flags

For detailed description this command, visit Linux manual pages.

Examples:

Unmount filesystem */dev/sda1*.

```
umount /dev/sda1
```

Note that mounted directory name can be used instead the filesystem path.

5. Licenses

Summarizes Open-Source Software (OSS) licenses used by this module.

Ext4 tools Licenses		
Project	**License**	**More Information**
e2fsprogs	e2fsprogs	License

Figure 1: licenses

6. Related Documents

You can obtain product-related documents on *Engineering Portal* at *icr.advantech.cz* address.

To get your router's *Quick Start Guide*, *User Manual*, *Configuration Manual*, or *Firmware* go to the *Router Models* page, find the required model, and switch to the *Manuals* or *Firmware* tab, respectively.

The *Router Apps* installation packages and manuals are available on the *Router Apps* page.

For the *Development Documents*, go to the *DevZone* page.