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Application Note on Flash memory media (uSD and USB) and the Barix Store&Play solution

The usage of Flash memory media (i.e. uSD cards and USD drivers) on embedded devices where the media is constantly accessed for program/erase cycles imposes some precautions in the way the system is used.

Flash memory media have individually erasable segments, each of which can be put through a limited number of erase cycles before becoming unreliable (wearing).

While in the past, and for small size and still for the industrial grade ones, the Flash are using Single-Level-Cell (SLC) with typical endurance of 100K up to 2M cycles, most of current commercial grade uSD are based on Multi-Level-Cell (MLC) Flash, with a declared endurance (if at all declared) as bad as 3K program erase cycles. Note that this is completely unrelated to the speed class (4 or 10).

Wear levelling implemented in the Controller inside those devices, attempts to work around these limitations by arranging data so that erasures and re-writes are distributed evenly across the medium. In this way, no single erase block prematurely fails due to a high concentration of write cycles.

In the Barix Store&Play solution the memory media, i.e. the embedded uSD card or the external USB drive, is accessed in write mode at every update interval as many time as requested by the number of files to be replaced.

In order to benefit from the wear levelling function of the media, and to avoid a fast wearing of it, it is highly recommended

- Not to fill completely the memory space (e.g. less than 80%)
- Reduce the update interval to the minimum required for your operation (e.g. once per day)

Also note that some configuration mistakes can cause an unneeded excess of write/erase cycles, e.g. corrupted files on the server, update window too small, large file exceeding the available space on the card …

While the SW on Barix unit is implementing some recovering mechanism at start up, if the memory cells get worn-out at the file system level, the card become not usable and has to be replaced.