

Tuxera Flash File System technical specifications

General information

Supported operating systems	<ul style="list-style-type: none"> • Android, Linux, Tizen, Chrome OS, and Firefox OS
Hardware architectures	<ul style="list-style-type: none"> • ARM, ARM64, Intel x86/x86_64 or compatible, MIPS, PowerPC, and more • Tuxera Flash File System is a kernel space solution built on top of Tuxera's widely deployed and robust file system implementation. • Conforms to SD Association (SD), and JEDEC (eMMC, UFS) specifications • Support for all flash-based storage types like eMMC, eSD, SD card, CF card, UFS card, SSD, USB, and SATA • Support for APM, GPT, and MBR partition schemes
Root/internal file system support	<ul style="list-style-type: none"> • Tuxera Flash File System is based on Tuxera file system implementation with the following extended features to meet all the requirements of the internal/root file system: <ul style="list-style-type: none"> • Symbolic links and device special file support (e.g., FIFO, Sockets, etc.) • Extended Attributes support • File owner and access permission support • Case sensitive support for file names • Hardlinks support
Capacity	<ul style="list-style-type: none"> • Maximum volume size: 8 EiB • Minimum allocation block size: 4096 bytes • Maximum allocation block size: 32 MiB • Maximum file size: <ul style="list-style-type: none"> » 32-bit system: <ul style="list-style-type: none"> » (8 TiB - 1) bytes with 4KiB CPU page size » (128 TiB - 1) bytes with 64KiB page size » 64-bit system: (8 EiB - 1) bytes • Maximum filename length: 255 bytes • Supported sector sizes: 512, 1024, 2048, and 4096 bytes

System requirements

Minimum system requirements	<ul style="list-style-type: none"> • 1 MiB of RAM • Processor: 25 MHz
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Memory and CPU footprint	<ul style="list-style-type: none"> • Read-write: 140—160 KiB • Read-only: 70—80 KiB • CPU usage: 0—20%
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Proprietary file system features

Power-safe/fail-safe	<ul style="list-style-type: none"> • Volume consistency ensured if storage is removed, or power or battery is disconnected.
Tuxera POSIX Test Suite	<p>Tuxera maintains POSIX File System Test Suite. The following system calls are tested:</p> <ul style="list-style-type: none"> • <i>chmod</i>: changes permission • <i>chown</i>: changes ownership • <i>link</i>: creates hardlinks • <i>mkdir</i>: creates directories • <i>mkfifo</i>: creates fifo files • <i>open</i>: opens a file • <i>rename</i>: changes file name • <i>rmdir</i>: removes directories • <i>symlinks</i>: creates symbolic links • <i>truncate</i>: decreases/increases file size • <i>unlink</i>: removes regular files, symbolic links, fifos, and sockets • <i>xacl</i>: reports errors when getting/setting an ACL

Flash memory-specific features

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| Optimized file system parameters | • Flash memory vendor-specific optimizations to reduce Write Amplification Factor |
| Wear leveling | • Inline Discard and FITRIM support |
| Storage optimizer | • Storage optimizer to ensure efficient random and sequential write operations |
| SDA- & JEDEC- compliant formatting tools | • Formatting tools compliant with SD Association and JEDEC specifications |

Performance and reliability

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| High performance | <ul style="list-style-type: none"> • Advanced algorithms, data structures, and low-level system integration ensure maximum I/O throughput, efficient memory and free space management, low CPU usage for small and large files, and high IOPS for file operations. Tunable settings and workload-specific optimizations. Low power use optimized for increased battery life. • When saving files in flash storage such as eMMC, SD cards, UFS cards, or MMC, full speed can be achieved. • Reduces data fragmentation • Prevents frame loss (drops) • Fast boot time |
| Reliability | • Rigorous quality assurance, wide deployment, and fault-tolerant design guarantee outstanding robustness. |
| Lifetime | • Flash-friendly by design, Tuxera Flash File System extends the lifetime of the flash-based media. |

Licensing and maintenance

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| Customization and maintenance | <ul style="list-style-type: none"> • Provides maintenance services so Tuxera Flash File System development can be safely customized using: <ul style="list-style-type: none"> » Product answers to inquiries » Minor version product available |
| Licensing | • Integration provided to adapt to any platform. |

Optional features

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| Online FSCK | • Background file system consistency check |
| Tools | <ul style="list-style-type: none"> • <i>mktffs</i>: formats volumes • <i>tffsck</i>: checks and repairs volumes • <i>tffslabel</i>: shows/sets volume label • <i>tffsuuid</i>: shows/sets volume UUID • <i>tffsinfo</i>: shows information about volumes • <i>tffsdebug/tffsdump</i>: collect debug images |

Get in touch to start your evaluation of Tuxera Flash File System: sales@tuxera.com