



High-performance file system for embedded flash memory

Reliance Velocity is a cutting-edge embedded file system designed to work with all the benefits and challenges of flash memory technology. Our modern flash-friendly file system has patented and proprietary optimizations to bring the ultimate performance, reliability, security, system integrity, and longest lifetime to any flash hardware. It includes extended features to meet requirements of an internal root file system, all while providing an optimal user experience over the full lifetime of the design. What's more, Reliance Velocity is easy to integrate into automotive embedded systems, with support for Linux, Android, and QNX RTOS, and excels at handling parallel workloads.

Optimized lifetime and performance

Put the brakes on flash memory wear-out. Reliance Velocity reduces memory degradation with remarkably low data fragmentation, efficient read and write operations, and advanced wear prevention features that assist the underlying flash controller, including online discard and fitrim support. With our proprietary optimizations, Reliance Velocity greatly reduces flash memory wear on a device, as demonstrated in the lower write and erase counts in in Figure 1. Our testing measured the total erases compared to the application writes, with the lower value from Reliance Velocity resulting in both better performance and lifetime.

For high-performance data and video recording, Reliance Velocity is second to none. Designs with multiple streams often experience additional overhead when applications close files and experience partial writes. Reliance Velocity handles this by allowing multiple threads to experience sustained high-speed data recording with no frame loss. Plus, high read/write speeds and low CPU usage ensure highly responsive systems.

Figure 1. Stream lifetime summary

* Lower is better

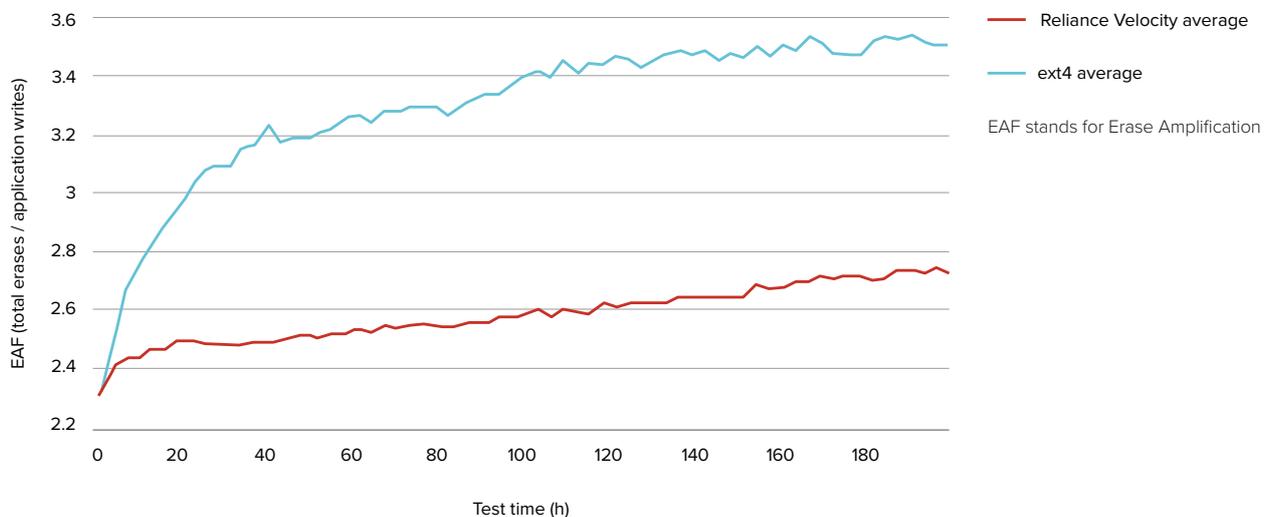
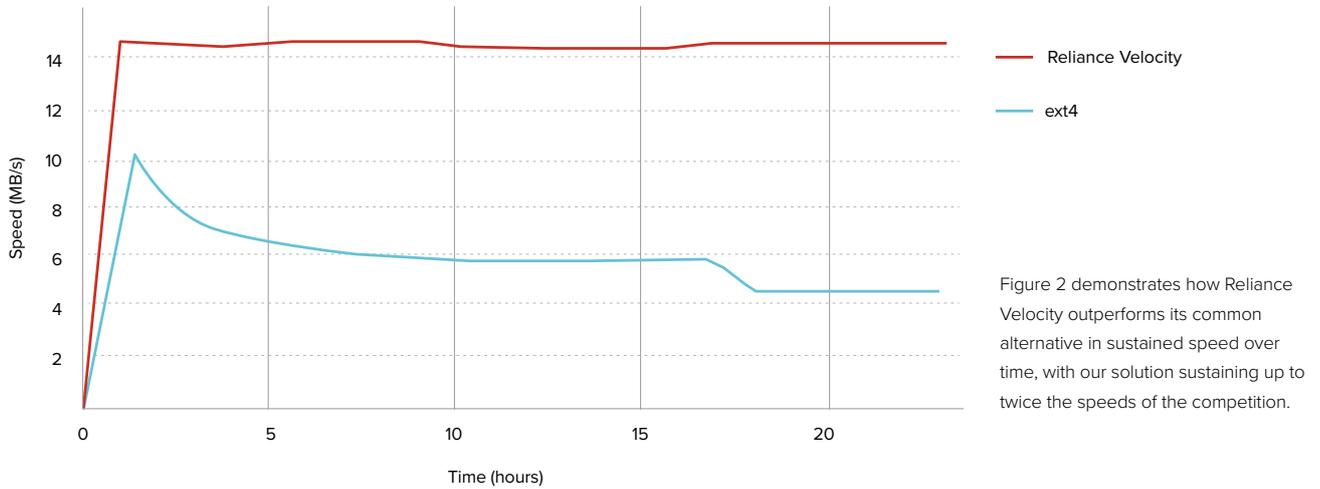


Figure 2. Typical multi-stream automotive workload performance



REQUIREMENTS

Target configuration	32-bit or 64-bit OS, any CPU, virtually any storage media
RAM requirements	100 KB to 150 KB
Supported media	eMMC and UFS, SD, SSD and PCIe, Raw flash media (with FlashFX Tera)
Media volume size	Maximum 8 Exabytes
Maximum file size	Same as volume size minus 1 byte
Maximum filename/path	255 bytes

FEATURES COMPARISON

	Reliance Velocity	Linux ext4	Linux VFAT
Specifically designed for flash-media devices	Yes	No	No
Provides system integrity	Yes	Yes	No
File system check after power loss	Background	Foreground	None
Fast, friendly support and customization	Direct	Forum	Forum
CPU usage during reads and writes	Low	High	Low
Options to reduce fragmentation and latency	Yes	No	No

Flash-friendly operation

Low write and erase counts and aggressively reduced fragmentation combine to provide the longest design life from limited NAND flash media. What’s more, our consulting engineers can provide estimates of these results through our Tuxera Flash Testing Service.

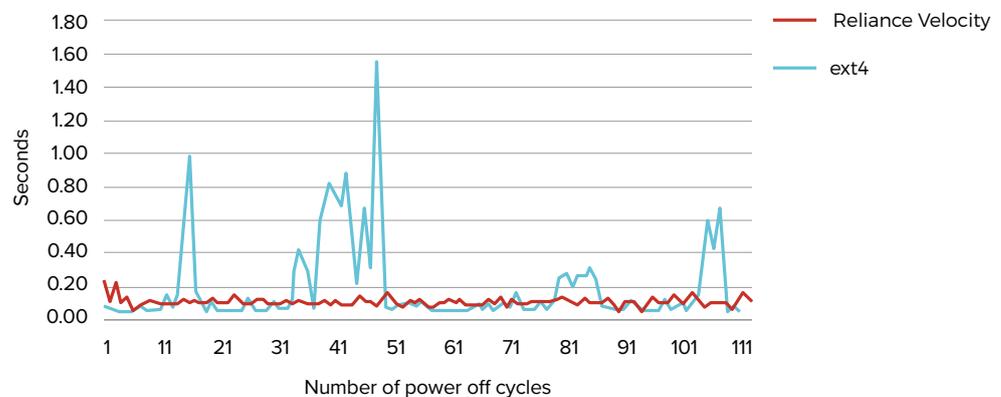
Fast and consistent mount time

2x faster average mount time than ext4

Test performed on ARMv8-A Cortex-A53 Automotive Soc, 32 GB UFS storage.

Figure 3. Mount time after forced, sudden power off

Reliance Velocity compared to ext4



Fast, consistent mount time with rock-bottom latency

After power interruption or system failure, data on the media will need to be checked. With Reliance Velocity, these checks are performed in the background, resulting in mount time that's 2X faster than ext4 on average. The fragmentation and write amplification minimizing algorithms within Reliance Velocity also allow you to experience minimal latency in your applications. So no matter the situation, you can always count on Reliance Velocity to have consistently low mount time and latency.

Protect data integrity

Errors, power loss, or crashes can cause data loss – or worse – system damage. Atomic writes and intelligent write order ensure videos and other data are reliably saved even during an unexpected power loss or system crash. Reliance Velocity also comes with built-in check and repair tools to ensure file system consistency, fix corrupted volumes, and recover lost files.

Cutting-edge security with modern Linux features

Add an extra layer of data protection. Our Linux solution includes advanced data security features and tools, such as such as encryption at multiple levels, user- and group-level quotas, secure delete, and dm-verity (secure boot) support. So whether you're focused on real-time patches or security enhanced Linux options, Reliance Velocity is the go-to premium option for modern Linux designs.

Premium validation and outstanding support

Reliance Velocity uses cyclic redundancy checks on all file system metadata to detect media failures. This early warning increases your customer's confidence in the system. When a failure does occur, our award-winning support team is available to offer comprehensive R&D support including integration, testing, benchmarking, reports, and product- and platform-specific optimizations.

**Let us ensure your embedded storage remains responsive and stable.
Get in touch with us at sales@tuxera.com**