



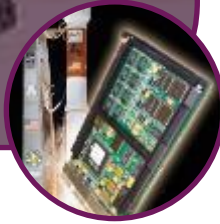
Introducing
Reliance Nitro™
Version 3.2

*High-performance fault-tolerant
data storage management*

Top 5 Reasons to Choose Reliance Nitro for Linux

#1: Fault-tolerance without compromising performance

- Outperforms basic file system by upwards of 50%
- Reliance Nitro preserves user data and file system integrity in the event of system failure by never overwriting live data



#2: Fast, consistent mount; Fast file access

- Maintains “known good state” for super fast file system mount. Variance of 0.1% in mount time regardless of workload or shutdown state
- Tree-based structure allows fast file access regardless of number of files or directories

#3: Flash-friendly operation

- Reliance Nitro uses a copy-on-write operation, which fits aligns better the nature of flash memory.

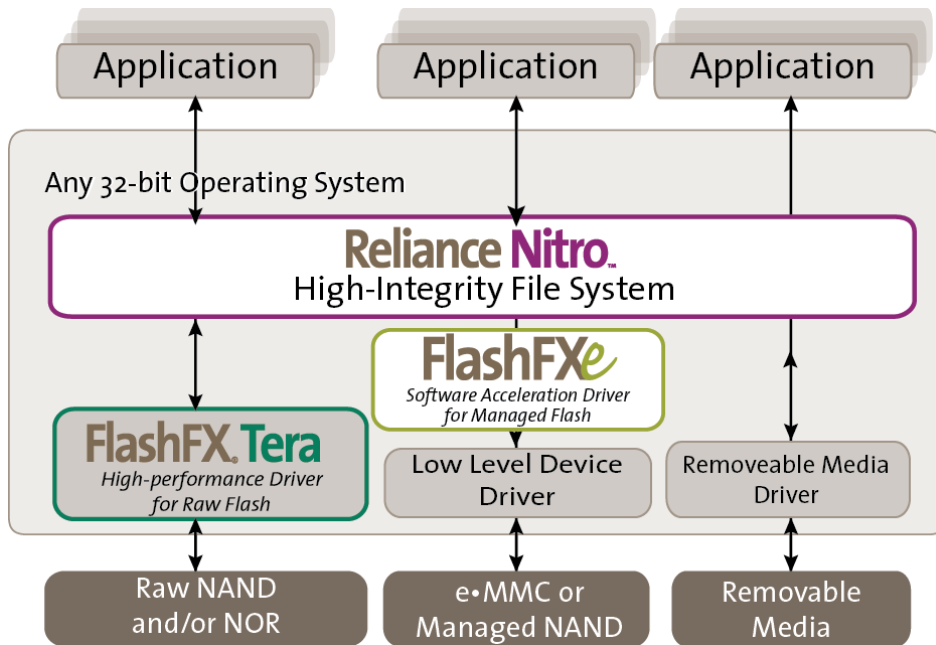
#4: Multi-Threaded, Simultaneous Reads While Writing

- No need to interrupt read operations to execute writes, reducing system latency

#5: Run-time Configuration of Data-at-Risk Controls

- Greater flexibility to optimize for unique use cases

Where Does Reliance Nitro Fit?



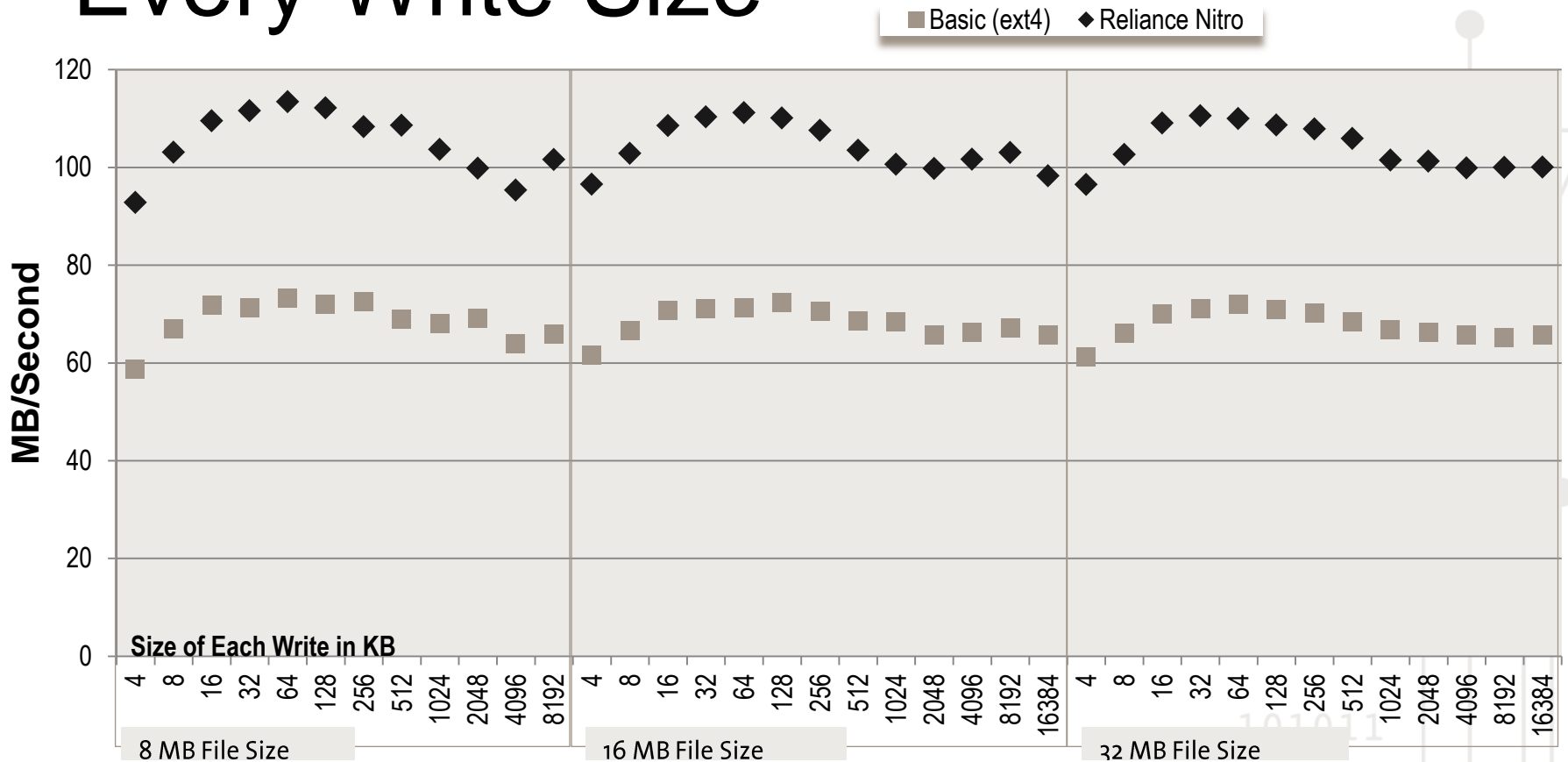
- Pre-ported to Linux/Android
- ANSI-C source code, kernel loadable module
- GPL-compliant
- Use standard block device drivers or pair with FlashFX Tera for raw flash or FlashFXe for managed flash

Configuration We Measured

- Pandaboard rev B
 - OMAP 4460
- Linux Kernel 3.5 and 3.9
- Android 4.1.1 (Ice Cream Sandwich)
- eMMC Media in SD slot
 - Micron 2KA28 JW705

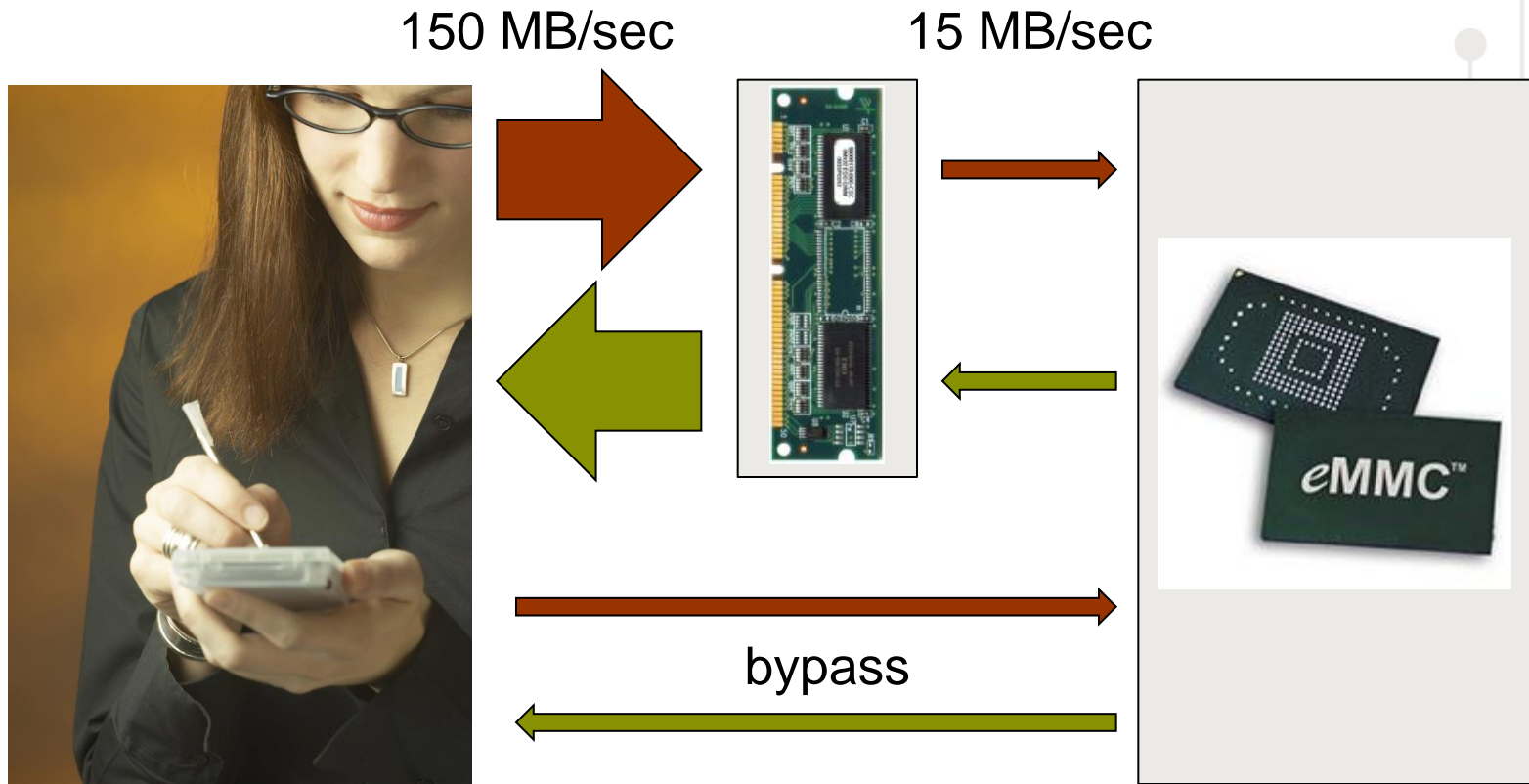


Improves Sequential Writes at Every Write Size

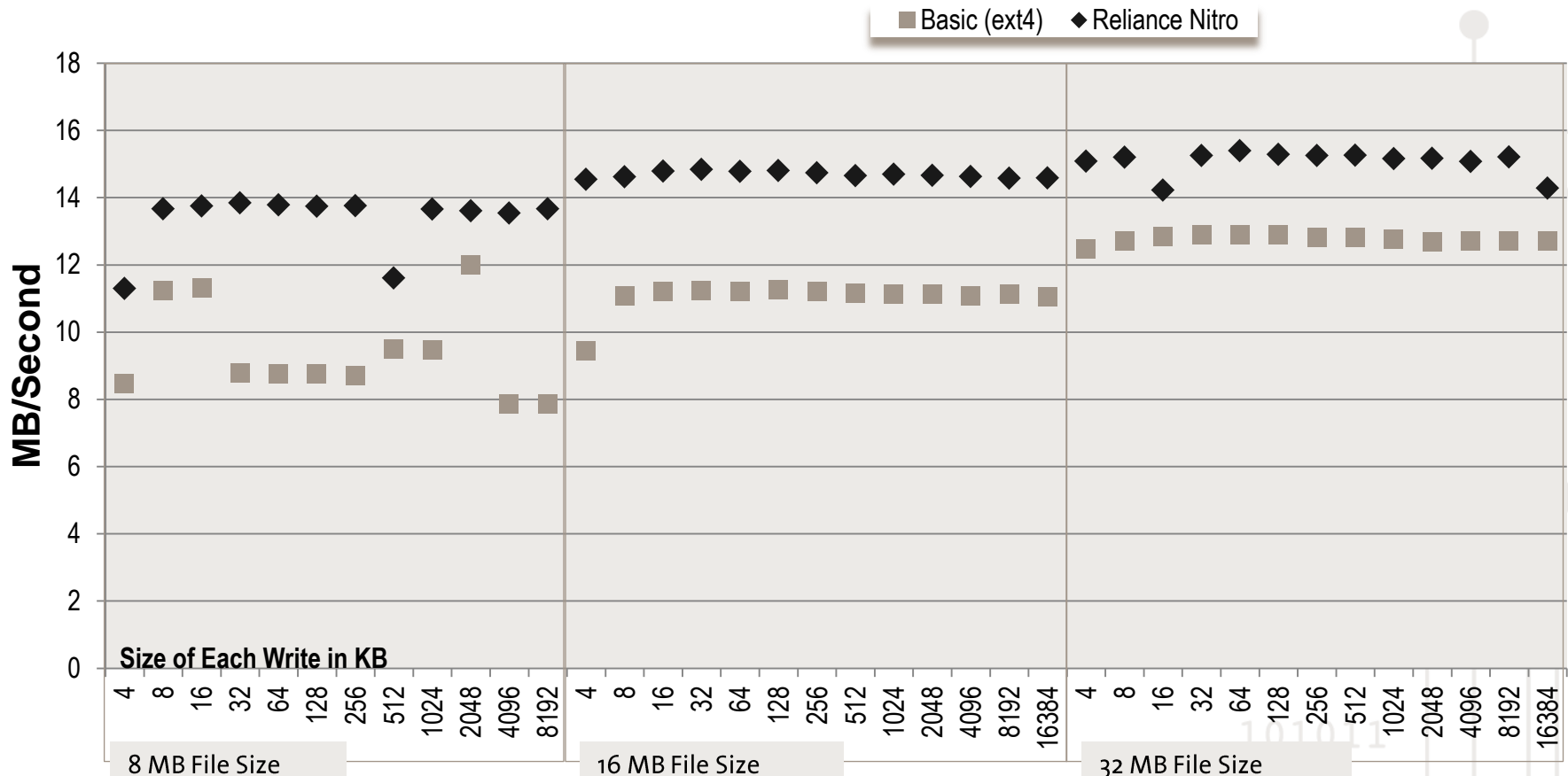


Results shown above are from IOZone, which tests three different file sizes written using a range of individual write sizes to determine optimal write size for a given system. Test was run three times and results for each data point averaged. Caching enabled.

What is Writeback Cache?



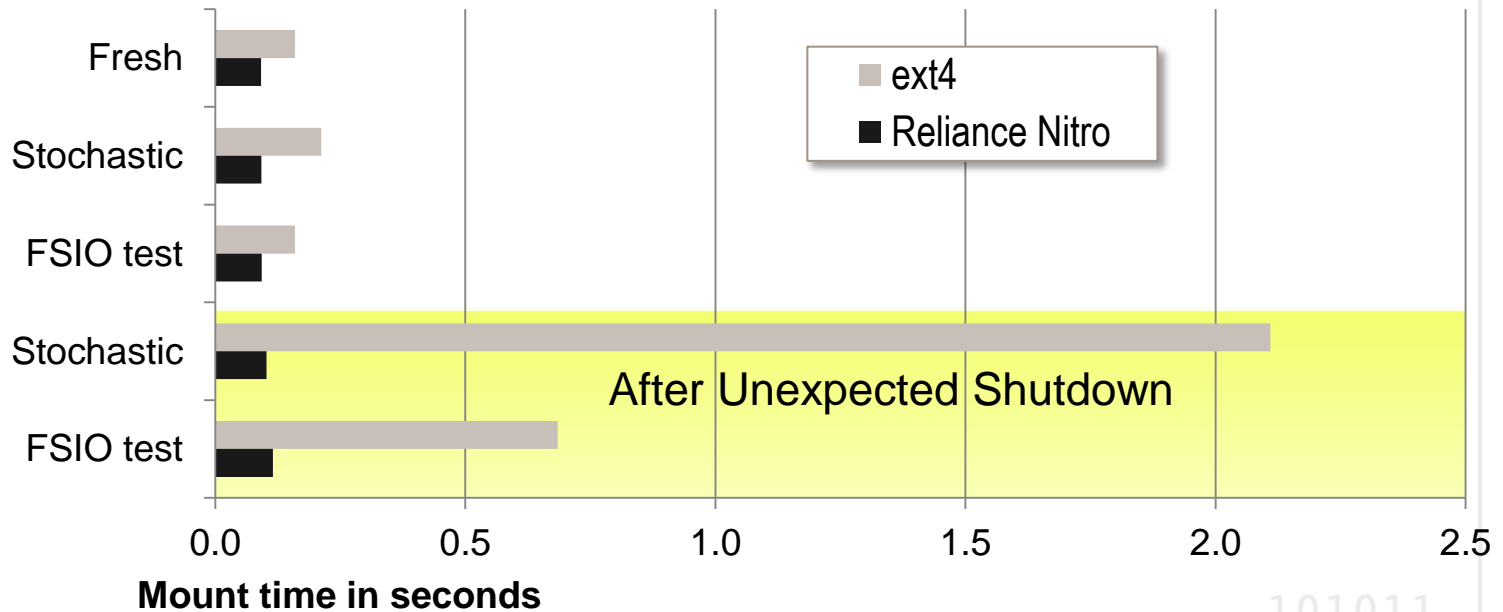
Performance to the Media



Results shown above are from IOZone, which tests three different file sizes written using a range of individual write sizes to determine optimal write size for a given system. Test was run three times and results for each data point averaged.

Enabling Fast Boot Times

- Remount times consistent & fast



– Even after a Power Interruption!

Linux & Android Versions

- Reliance Nitro supports Linux kernels from 2.6.31 through 3.9
- Tested with Android versions 2.3 (Gingerbread) to 4.3 (Jelly Bean)
 - Android environments work on a variety of Linux kernels – limited by Google distribution and hardware support packages

New in Reliance Nitro 3.2

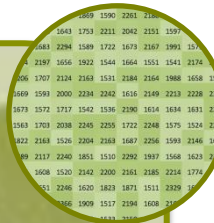
Features	Benefits
Reduced Size of Kernel Modules	ARM compiled modules are less than half the size of the 3.0 release
Faster CRC-32 Computation	CRC-32 used for all file system metadata – across the board speed
Disk Geometry Improvements	Large Sector counts supported; No open file limit
Updated operating system support	Android 4.3 (Jelly Bean), Linux kernel 3.10



Top 5 Reasons to Choose FlashFXe for Linux / Android

#1: Closes eMMC performance gap

- Improves Random Write Performance up to 7x
- Streamlines writes to maximize throughput
- Architected to allow expansion to new controllers and flash parts with minimal changes



#2: Improves flash endurance by nearly 60%

- Reduces write amplification – a key shortcoming of solid state storage, resulting in significantly fewer erases.

#3: Improves energy-efficiency by nearly 50%

- Uses less power for same workload
- Completing I/O faster lets system sleep more

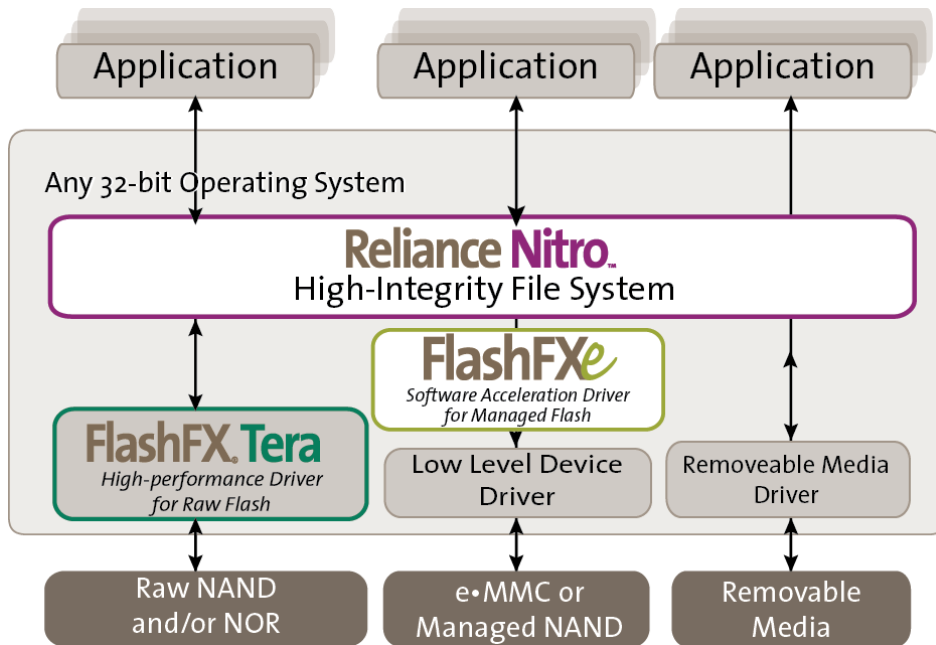
#4: Allows greater flexibility in component specification

- Smooth out performance differences between parts from different vendors, increasing purchase options

#5: Backed by experts in flash management and reliable data storage

- Industrial grade software fully tested and documented.
- Decades of flash management experience across the spectrum of embedded devices.

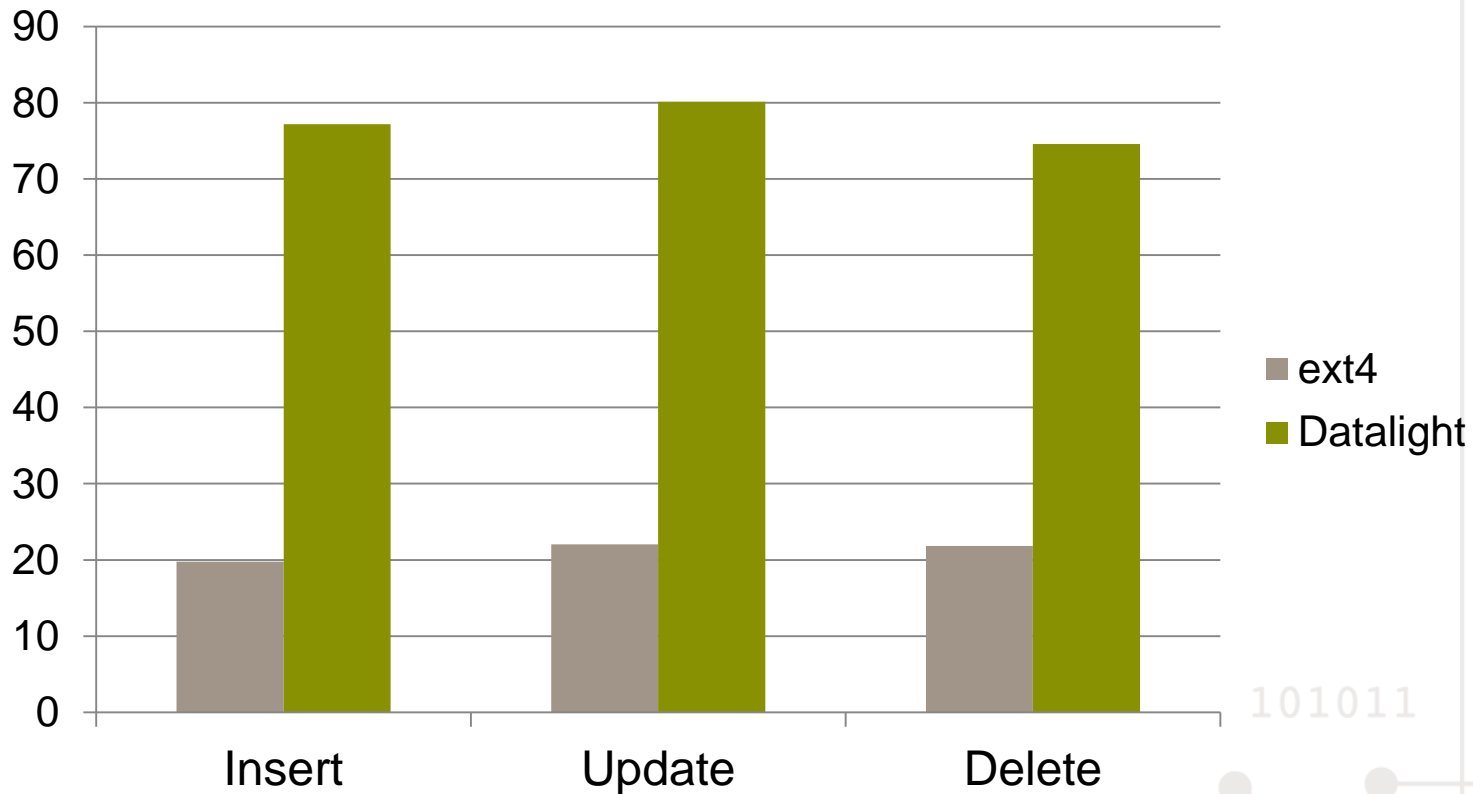
Where Does FlashFXe Fit?



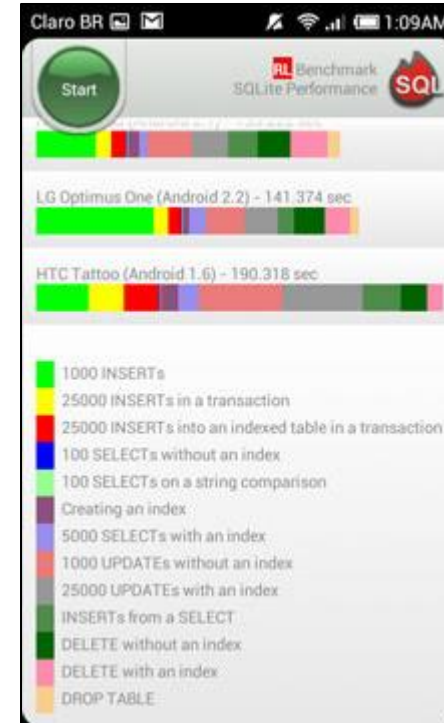
- Enhances Reliance Nitro to optimize random I/O on flash managed by hardware controller
 - eMMC, eUSB, eSATA, SD, SDXC, SDHC
- Integrates with low-level device driver
- Pre-ported to Linux/Android only at this time

Performance with FlashFXe

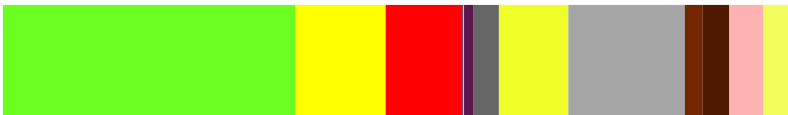
Androbench - SQLite Transactions/sec



Android Performance



Datalight Solution - 42.586 sec



Basic Linux Solution - 80.701 sec



Linux/Android File Systems

	Ext4	Reliance Nitro 3.2
Architecture	Logging, writes are not Atomic	Transactional, Atomic Writes
Tree-based (faster access to large # of files)		✓
Extent based (faster seq I/O, less fragmentation)	✓	✓
ACID Compliant Reliability		✓
User Data Never Overwritten		✓
Metadata CRC Protection	Partial	Complete
Configurability	Compile and Mount Time	Compile, Mount and Runtime
Mount Time	Time Increases with disk size and shutdown state – variance of 70.0%	Fast and Consistent in any situation – 0.1% variance
Designed for Flash Memory		Traditional and modern flash
File Level Secure Delete		✓
Support	Community-based, self-service	Responsive, accountable support

Top 5 Reasons to Choose Datalight for Engineering Services

#1: Deep Expertise in Data Storage

- Knowledgeable on storage configurations for complex use cases
- Experienced in working with complex storage media such as raw flash memory, eMMC and SD, CF; specialized boot configurations



#2: Industrial-grade Code Quality

- Decades of commercial product shipments using well-proven quality assurance and coding standards
- Delivery options for source code or object code



#3: Detailed Documentation

- Accustomed to detailed documentation of code and designs
- Certificate of Originality issued upon request



#4: Continuity of Experienced Talent

- Engineers steeped in data storage technology specifically for embedded devices
- Average tenure of team exceeds 8 years



#5: Agile, Communicative Project Management

- Thorough project definitions documented and verified with client
- Proactive communication of project status never leaves you guessing

Types of Available Services

- Consulting on design of optimal storage options for your unique project constraints and use cases
- Integration of Datalight products into your environment
- Development of custom extensions to Datalight technology

Where to Learn More...

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Product Details

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