WHITE PAPER

Voltex Performance Engine

Methodology of User-Mode Scheduler Hints and Frametime Stabilization

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1. Executive Summary

Modern Windows operating systems prioritize fairness scheduling, which introduces frametime variance, context switching, and interrupt contention. The Voltex Performance Engine is a user-mode system optimizer that aligns CPU scheduling behavior with real-time game execution using documented Windows APIs. The objective is frametime stability and improvement of 0.1% lows rather than artificial average FPS inflation.

2. Design Philosophy: Fairness vs. Real-Time Execution

Games rely on deterministic CPU access. Windows fairness scheduling introduces preemption and power-state transitions that disrupt real-time workloads. Voltex temporarily biases scheduler decisions toward foreground workloads while remaining fully compliant with OS security constraints.

3. Functional Architecture of Voltex

The Voltex Performance Engine is composed of multiple cooperating subsystems designed to mitigate latency at different stages of the Windows execution pipeline. Each subsystem operates independently but is coordinated through a central policy controller that adapts behavior based on system load and foreground activity.

3.1 Micro-Burst Frequency Tuning (MBFT)

MBFT manages system timer resolution using documented Windows timing APIs. By forcing the timer into a stable high-resolution state during gameplay, Voltex reduces scheduler jitter, minimizes CPU wake latency, and improves synchronization between CPU scheduling cycles and GPU command submission.

3.2 Adaptive Interrupt Affinity Re-balancing

This subsystem analyzes CPU topology and active thread placement. Non-critical hardware interrupts such as network and HID events are re-routed away from game-critical cores, reducing interrupt-driven preemption and improving frametime consistency.

3.3 Scheduler Quantum Alignment

Voltex issues scheduler-level hints using documented Windows priority and power throttling APIs. Foreground game threads are favored while background processes are shifted into efficiency-oriented execution states, preventing interference with the render pipeline.

3.4 Power State & Idle Suppression

During active gameplay, Voltex temporarily suppresses aggressive CPU idle transitions and deep power-saving states. This prevents latency spikes caused by core wake-up delays while remaining fully reversible after the session ends.

3.5 Hardware-Aware Policy Selection

At startup, Voltex performs a lightweight hardware signature analysis. CPU architecture, core topology, and memory latency characteristics are evaluated to select appropriate optimization policies without relying on static presets.

4. Scope & Limitations

Voltex is a CPU-bound latency mitigation suite. It does not modify GPU shaders, overclock hardware, or inflate synthetic FPS metrics. Impact varies by CPU architecture, cache topology, and workload characteristics.

5. Empirical Case Studies & Benchmarks

All benchmarks were captured using CapFrameX with identical settings and scenarios. All values below are reproduced verbatim from measurement output.

Table 5.1 – Fortnite (AMD Ryzen 5 3600 / Radeon RX 570)

Metric	Baseline	Voltex Enabled
Smooth Time	237.05s (98.8%)	239.14s (99.6%)
Low FPS Time	0s (0%)	0s (0%)
Stuttering Time	2.96s (1.2%)	0.86s (0.4%)
< 2ms Variance	91.65%	89.47%
< 4ms Variance	6.16%	8.66%
< 8ms Variance	1.23%	1.53%
< 12ms Variance	0.41%	0.22%
> 12ms Variance	0.54%	0.12%

Table 5.2 – Counter-Strike 2 (Intel Core i5-4670 / NVIDIA GT 1030)

Metric	Baseline	Voltex Enabled
Smooth Time	227.21s (94.7%)	239.56s (99.8%)
Low FPS Time	8.81s (3.7%)	0s (0%)
Stuttering Time	3.95s (1.6%)	0.43s (0.2%)
< 2ms Variance	86.34%	93.27%
< 4ms Variance	10.17%	5.07%
< 8ms Variance	2.45%	1.21%
< 12ms Variance	0.27%	0.25%
> 12ms Variance	0.77%	0.21%

Table 5.3 – Call of Duty: Warzone (AMD Ryzen 5 3600 / Radeon RX 570)

Metric	Baseline	Voltex Enabled
Smooth Time	238.34s (99.3%)	239.24s (99.7%)
Low FPS Time	0s (0%)	0s (0%)
Stuttering Time	1.69s (0.7%)	0.75s (0.3%)
< 2ms Variance	81.70%	87.36%
< 4ms Variance	12.12%	10.28%
< 8ms Variance	4.68%	1.74%
< 12ms Variance	0.94%	0.23%
> 12ms Variance	0.56%	0.39%

6. Security, Integrity & Anti-Cheat Compliance

Voltex uses no code injection, kernel drivers, or undocumented hooks. All optimizations are reversible and designed to remain compliant with modern anti-cheat systems.

7. Conclusion

Voltex demonstrates that frametime stability can be materially improved through compliant user-mode scheduling optimization focused on latency consistency.

8. Benchmark Integrity Statement

All values presented are reproduced directly from CapFrameX output and are reproducible on equivalent hardware.