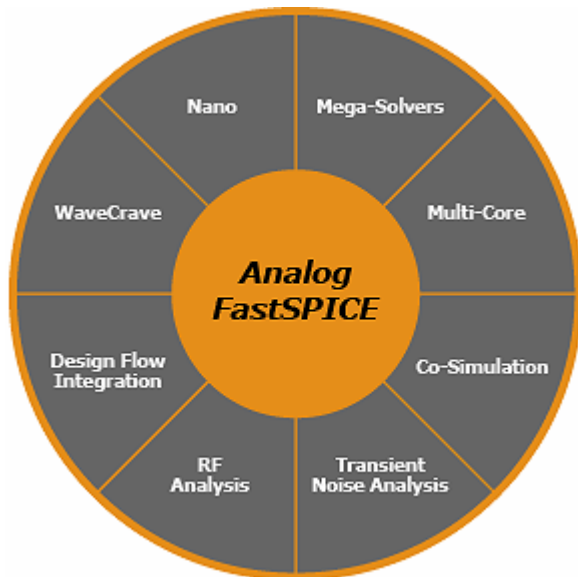




Analog FastSPICE™ Platform

The *Analog FastSPICE™ Platform (AFS Platform)* is a unified circuit verification platform that provides analog, mixed-signal, and RF (AMS/RF) design teams the ultimate in accuracy, performance, capacity, and functionality. The *AFS Platform* delivers true SPICE accuracy, 5x-20x higher performance, >10M-element capacity, and advanced analyses. AMS/RF design teams that use the *AFS Platform* from block-level design through full-circuit verification can design and verify circuits twice as fast and still perform a far more thorough verification than is possible with traditional circuit and RF simulation tools.



The *AFS Platform* is a modular single-executable implementation that guarantees identical waveforms to traditional SPICE in every run regardless of design size, complexity, or type of analysis. Its modularity enables independent optimization of every component, while ensuring all functionality works together seamlessly.

At the block level, the *AFS Platform* delivers the fastest iterations, the only nanometer-accurate device noise analysis, and unparalleled corner and variation analysis. Complex blocks such as ADCs, PLLs, and SerDes require long runtimes with detailed parasitics and device noise effects included — simulations only possible with the *AFS Platform*. Finally, the *AFS Platform's* >10M-element capacity and performance enable full-circuit DC operating point generation and performance simulation, including complex package models and HDL co-simulation of top-level digital logic.

Delivering 2x Higher Efficiency

The *AFS Platform* is tightly integrated into the leading custom design environment, supports leading SPICE netlist formats and models, and produces standard outputs. The *AFS Platform* never trades off or compromises accuracy for performance, capacity, or functionality. Through increased productivity, 5x-20x faster turnaround times, and thorough analysis of all physical effects, design teams realize a proven 2x improvement in overall efficiency.

Block-Level Design

- 5x-10x faster transient analysis
- 5x-10x faster periodic analysis
- Detailed device noise impact
- Rigorous characterization

Complex-Block Verification

- 5x-20x faster transient analysis
- Detailed parasitic impact
- Device noise impact
- HDL co-simulation

Full-Circuit Verification

- 10M element capacity
- Targeted perf. simulations
- Inter-block validation
- Silicon-package analysis

Circuit	Elements	MOS	SPICE	BDA	Speedup
RFIC Top-Level	4.2M	3.7M	DNC*	9 days	Infinite
Transceiver Full-Circuit	2.1M	350K	DNC*	1.5 days	Infinite
Extracted PLL	3.7M	81K	DNC*	4.7days	Infinite
802.11 Transceiver	150K	100K	DNC*	<6 hrs	Infinite
Sigma-Delta ADC (3rd)	64K	15K	5 days	4.5 hrs	25x
DC:DC Converter	38.6K	33.4K	6.5 days	18 hrs	8.6x
PLL (65nm), 50-60 corners	13.6K	7.3K	7 days	20 hrs	8.4x
Amplifier, Monte Carlo	1.1K	712	4.6 hrs	33 min	8.5x

* Did Not Converge



Analog FastSPICE Platform

AFS Circuit Simulator

- True SPICE accuracy
- 5x-20x faster performance
- >10M element capacity
- Analyses:
 - DC (.op and sweep), AC, transient
 - Network analysis, transfer function
 - Monte Carlo, alter, sweep, .measure
 - AC noise analysis (.noise)

AFS Mega-Solvers

- High-performance matrix solvers
- Optimized for massive post-layout circuits

AFS Multi-Core

- Multi-threading: up to 2X faster on 4-cores
- Helps large and post-layout circuits

AFS Co-simulation

- HDL co-simulation with Verilog[®] simulators

AFS Transient Noise

- Device noise analysis for all circuits
- Analyzes white noise and flicker noise

AFS RF Analysis

- Full spectrum PSS, pnoise, and oscnoise
- >100K element PSS convergence
- Impulse sensitivity function (oscnoise)

AFS Nano

- True SPICE accuracy for small blocks
- Up to 5K element capacity @ \$1,900
- Analyses:
 - DC, transient, AC, and .noise
 - Network analysis, transfer function

Monte Carlo, alter, sweep, and .measure

AFS Design Flow Integration

- Seamless integration with the leading EDA design environment

AFS WaveCrave Waveform Processor

- Wide range of capabilities for viewing simulation results

Accuracy

Berkeley Design Automation guarantees that the AFS Platform produces identical waveforms to the leading “golden” SPICE simulators down to SPICE tolerance settings, which by default are typically within ~0.1% of the magnitude of the desired signal. For the most sensitive measurements, the AFS Platform provides time-domain accuracy exceeding 120 dB of dynamic range. Doing so requires generating true operating points and solving the full-circuit matrix and original device equations each timestep without ever taking shortcuts.

Performance

The AFS Platform achieves 5x-10x higher performance versus traditional SPICE simulators on a single core. With multiple core operation, the AFS Platform can deliver 2x additional performance for a total 5x-20x speedup. It achieves this through advanced numerical analysis and computational efficiency – never by sacrificing accuracy.

Capacity

A circuit simulator’s useful capacity is a function of DC convergence and performance. The AFS Platform robustly converges on circuits with >10M total elements. Coupled with 5x-20x higher performance, the AFS Platform can run full-circuit performance simulations in a timeframe of relevance.

Specifications

- Inputs: leading SPICE netlists and models
- Model support
 - Gummel-Poon, HICUM, Mextram, VBIC
 - BSIM3, BSIM4, BSIMSOI, MOS11, PSP
 - MOS1, MOS3, JFET, Diode, Juncap
 - Verilog-A, S-parameter, W-element
- Outputs
 - PSF ASCII, PSF binary, tr0, FSDB
 - Nutmeg ASCII, Nutbin, Nutbinf
- Operating Systems:
 - Linux or Solaris