Adobe

Solution brief

Your solution is

GPU ready

with Adobe PDF Print Engine

Smart GPU acceleration. Trusted CPU execution. End-to-end Adobe intelligence.

Rising complexity Rising expectations

Advances in modern compute platforms are creating new opportunities for the next generation of print performance, even as production print operations are accelerating on every front. Print Service Providers (PSPs) are running more jobs per shift, serving multiple market segments and receiving print jobs from a wider range of creative and enterprise workflows. Today's workloads demand advanced capabilities like transparency handling, spot color management, variable data printing, step-and-repeat, high-resolution imagery, and complex vector graphics all while meeting tight delivery windows, ensuring consistent quality, and driving lower cost per job.

At the same time, the industry is operating under intense cost pressure. PSPs and OEMs need to increase throughput, reduce idle press cycles, and ensure that every shift produces maximum output. They seek ways to run more jobs per shift, maintain rated press speeds even for challenging jobs, and eliminate latency and bottlenecks that slow production.

These shifting expectations are reshaping business KPIs. The market imperative remains clear: print fidelity, speed, and cost efficiency must scale together. RIP performance must stay ahead of modern press capabilities so that no press cycle is wasted and the production line stays fully utilized. These demands align with the new capabilities unlocked by today's heterogeneous CPU + GPU compute platforms.

From CPU to GPU: The next leap forward

The evolution from CPU-only systems to heterogeneous CPU+GPU compute platforms has opened the door to new levels of print performance — a transition Adobe has been preparing for. The hardware landscape that underpins production print has been rapidly evolving. The industry moved from single-core CPUs to multi-core CPUs, and today many systems combine multi-core CPUs in distributed environments with GPUs that offer large-scale parallel processing capacity. As GPUs become more widely available and more affordable, they present new opportunities to accelerate parallel compute-intensive parts of the print workflow.

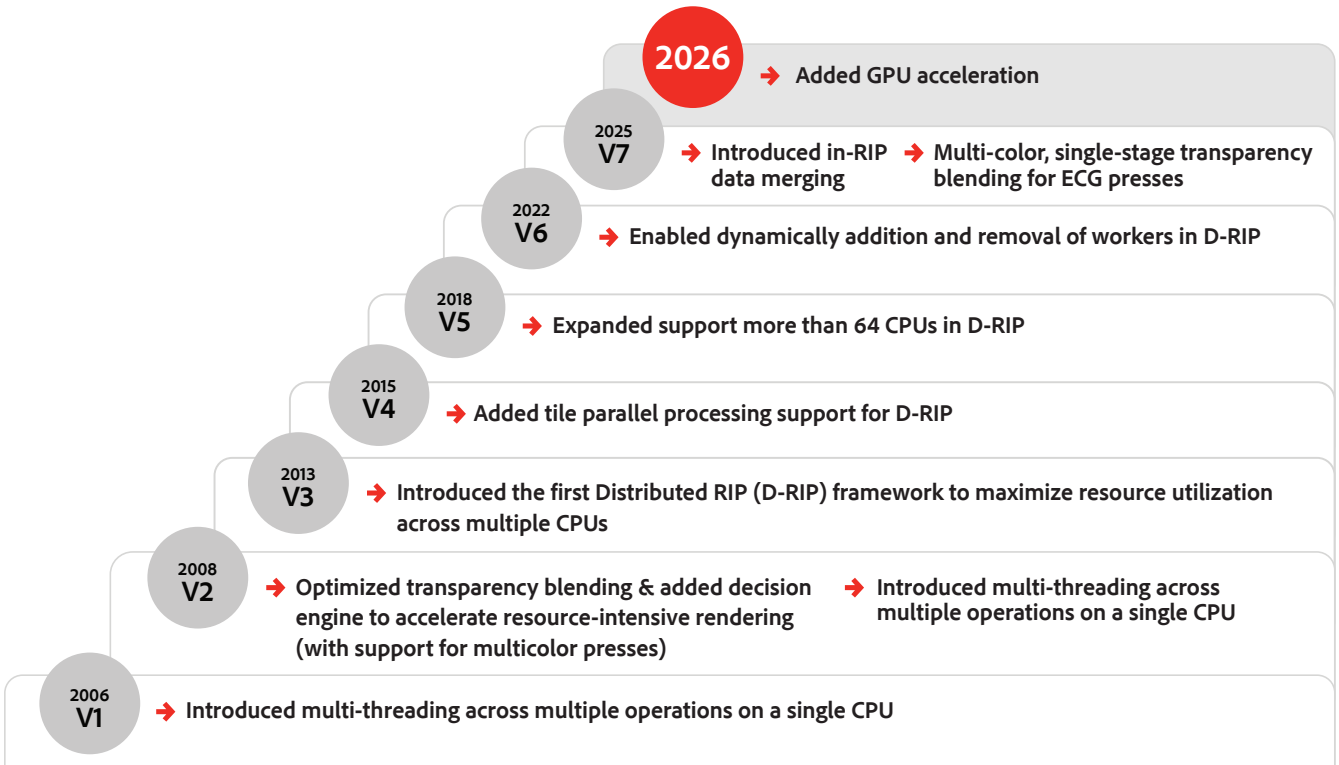
This shift creates an opportunity for RIP technology providers to bring together the strengths of CPU + GPU in a way that delivers meaningful real-world performance gains. CPUs remain essential for sequential and logic-driven tasks such as PDF parsing that rely on ordered dependencies. GPUs, on the other hand, are ideal for parallel workloads like image processing, color conversions, and reuse of cached rasters.

The question now is how effectively CPU and GPU can be combined to unlock increased performance. Print ecosystems need to intelligently leverage both, making full use of the latest available hardware while complementing CPU workloads with GPU acceleration.

The Adobe PDF Print Engine approach

The Adobe Print Team has been building cutting-edge print solutions for more than four decades. Our mission has always been clear: capitalize on hardware innovation to deliver real-world performance gains. We set the agenda for the industry by focusing on practical, end-to-end outcomes, not hype, and by continuously advancing both our software and our use of the latest hardware.

Over the years, Adobe PDF Print Engine has introduced many breakthrough capabilities, and was often first to market with them, enabling next-level performance gains for our customers.



Relentless performance innovation

Today, combining the strengths of CPU and GPU is the natural next step in our journey, and will remain central to our technology strategy.

Setting the record straight on GPUs

Common claims

"Just offload everything to the GPU"

Adobe perspective

Sometimes offloading to the GPU can degrade performance due to data transfer and synchronization overhead. Dedicated GPUs incur added overhead from transferring data between separate CPU and GPU memory spaces, which limits performance gains for smaller data chunks or frequent CPU-GPU handoffs.

Common claims

"GPUs always increase performance"

Adobe perspective

GPUs can deliver impressive acceleration for the right kinds of tasks. But smaller jobs, lightly parallel tasks, or operations that require constant handoff between CPU and GPU may see little benefit. In some cases, moving data to the GPU can even slow processing. Real gains come from applying GPU power selectively to workloads that truly benefit from parallel acceleration.

Common claims

"Parallel GPU processing is always faster than sequential processing"

Adobe perspective

Parallel processing is very effective for independent tasks, and GPUs shine for repetitive pixel-level calculations. However, many parts of a RIP pipeline cannot be parallelized. The best performance is achieved when CPUs and GPUs are utilized in a way that maximizes their respective strengths.

Common claims

"More GPU cores always mean more speed"

Adobe perspective

Parallel processing is very effective for independent tasks, and GPUs shine for repetitive pixel-level calculations. However, many parts of a RIP pipeline cannot be parallelized. The best performance is achieved when CPUs and GPUs are utilized in a way that maximizes their respective strengths.

Common claims

"GPUs are cost-effective"

Adobe perspective

GPUs can be a cost-effective way to boost performance for workloads that benefit from massive parallelism. In those cases, they may deliver better value than scaling with additional servers. But this is not true for every job mix. If the workload is not GPU-friendly, the investment may not produce meaningful gains. The cost advantage depends entirely on how well the workload maps to GPU acceleration.

By combining the strengths of CPU and GPU, Adobe PDF Print Engine enables customers to run more jobs per shift, drive presses at their rated speeds, and achieve maximum return on press investments.

Lead with maximum fidelity, protect workflow intent

CPU remains the foundation for sequential tasks (such as parsing). This preserves Adobe fidelity and ensures that print reproduction faithfully reflects the designer's intent.

Accelerate the right places

We selectively offload highly parallel, compute-intensive operations to the GPU, such as image resampling, color conversion, and cached rasters compositing.

Intelligent fallback for smaller jobs

When tasks fall below the threshold for meaningful GPU acceleration, such as jobs having low-volume operations or highly sequential steps, they remain on the CPU. This avoids unnecessary transfer overhead and ensures throughput remains steady.

Hardware-friendly by design

OEMs can enable GPU acceleration on available hardware with no changes to existing DFE product code. Adobe PDF Print Engine adapts to integrated and discrete GPUs as deployed.

Proven gains, realistic expectations

We have observed major performance improvements (up to 10.5x maximum speed up, net RIP time reduction of 19% across all test files) where workloads match GPU strengths. Actual results vary by nature of job, memory bandwidth, and configuration; our guidance helps OEMs apply acceleration where it truly pays off.

Adobe brings GPU power not only to the RIP but to the entire print journey, from content creation to consumption. GPU support makes Adobe creative apps faster and keeps production workflows optimized.

Create:

Photoshop uses GPU acceleration for quick image adjustments that keep production moving. Illustrator's GPU Preview enables realtime editing of complex vectors and artwork. InDesign uses GPUs to deliver fluid zooming, scrolling, and layout previews on high resolution screens.

Preview:

Acrobat leverages GPU power for faster PDF rendering and page navigation, enabling more efficient proofing and approvals.

Print:

Our GPU-assisted rendering architecture powers the **Adobe Production Print Experience (APPEx)**. APPEx combines the world's fastest rendering technology and AI-powered optimization to deliver intelligent, streamlined print workflows.

As the hardware landscape evolves, Adobe will remain at the forefront, leveraging new GPU capabilities and emerging hardware innovations to ensure your solutions achieve their peak performance.

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Talk to your Adobe representative today to unlock GPU-powered acceleration for your solutions!

For more information

Visit: www.adobe.com/go/appe | Email at: pdfprintengine@adobe.com