WHEN PACKAGING STARTS TALKING BACK

Justin Bailey of Hybrid Software Helix, gives an insight into the company's recent rebrand and explains how its intelligent, graphics processing unit (GPU)-native software could become the decisive factor in enabling industrial inkjet presses to keep pace with evolving brand and consumer expectations

Justin Bailey, Managing Director, Hybrid Software Helix

A brightly stocked supermarket shelf, where products rely on their packaging to compete for attention. Practical elements such as barcodes, pricing data and nutritional information are all included

As packaging becomes more interactive, personalised and data-driven, the pressures on digital print systems intensify. On any supermarket aisle it is clear that packaging is no longer simply a container. It is a billboard, a storyteller, a brand touchpoint and, increasingly, a digital gateway. Today, packaging is expected to be sustainable, visually striking, personalised and relevant to individuals. It can also be interactive. This could mean scanning a code to unlock augmented reality content, tracing a product's journey from source to shelf or checking a product's authenticity.

COMPETITIVE CONVERTERS

For converters, these expectations change everything. Shorter runs, more product codes, greater variability and tighter brand controls are becoming the norm rather than the exception. Traditional production models, built around long runs and static designs, are being stretched to their limits. To remain competitive, converters are turning to automation, robotics and AI-driven workflows to maintain consistency while producing more jobs, faster and often in parallel.

Digital printing, particularly industrial inkjet, is uniquely positioned to meet these demands. Variable data, late-stage customisation and rapid changeovers are inherent strengths of digital technology. But as consumer expectations accelerate, so too

does the pressure on the entire supply chain behind the press. The burden does not fall on converters alone. It also lands squarely on the shoulders of original equipment manufacturers (OEMs). These are the companies tasked with designing and delivering presses capable of handling this new reality. At the heart of that challenge lies software.

"Harlequin RIP powers many of the industry's most successful digital presses"

THE INVISIBLE BOTTLENECK

From the outside, progress in industrial inkjet is often measured in hardware terms – faster print engines and wider webs. Yet many of the most critical limitations are invisible. As jobs become more complex, the software pipeline must process enormous amounts of data at lightning speed, without compromising quality, for example, combining variable text, images, security features and colour-critical brand elements. Raster image processing (RIP), colour management and post-processing are no longer background tasks. They determine whether or not a press can keep up with production speeds, switch seamlessly between jobs and achieve the final

output to match the brand owner's expectations, every time.

OEMs face a delicate balancing act. They need to get to market quickly with differentiated solutions, while keeping hardware costs under control. Adding more central processing units (CPUs) to brute-force performance is expensive, power-hungry and often inefficient. The question is no longer simply how fast a press can print, but how intelligently its software can orchestrate the available computer resources.

DYNAMIC EFFICIENCY

As a long-standing supplier to press manufacturers, Hybrid Software Helix has a clear view of the pressures shaping industrial printing. Formerly Global Graphics Software, Helix brings over 40 years of digital printing expertise. The company's Harlequin RIP powers many of the industry's most successful digital presses. This experience spans the transition from analogue production to digital automation and now, to adaptive, software-driven platforms.

The Helix name reflects this evolution. Inspired by the double helix of DNA, it represents the embedded intelligence Helix software brings to modern print systems. Today,
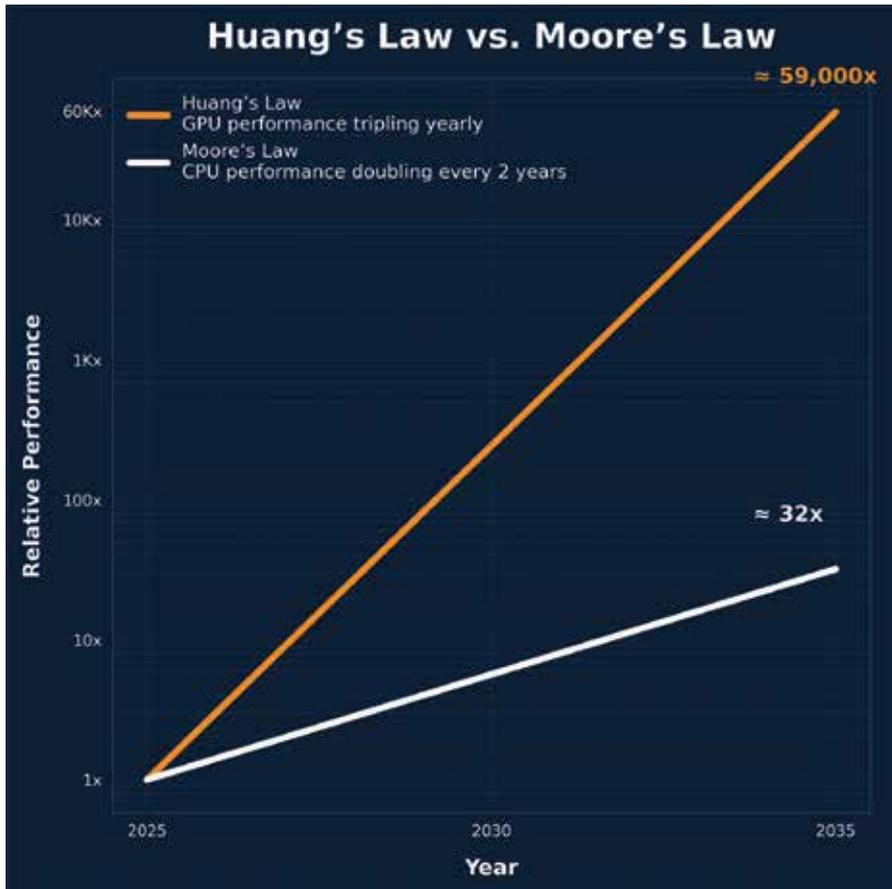
Huang's Law versus Moore's Law – GPU performance is accelerating far faster than traditional CPU scaling. This triples each year compared to CPUs, which double every two years. It drives an estimated 59,000× performance gain by 2035

Coca-Cola's iconic red must be precise and consistent every time, keeping the global brand unmistakable at every glance

Helix has evolved from providing core RIP technology to delivering intelligent software components at the heart of industrial-printing presses. For Helix, the future of industrial inkjet lies in how software components work together – dynamically, efficiently and at scale.

GPU HEAVY LIFTING

One of the most significant shifts in computing over the past decade has been the rise of the graphics processing unit (GPU). Originally designed for graphics, GPUs now outperform CPUs by a wide margin on highly parallel workloads. That matters in industrial printing, where millions or billions of pixels must be processed deterministically and repeatedly.

Helix's Apex (hybridhelix.com/technologies/apex) rendering technology takes a decisive step in this direction. Rather than merely accelerating isolated stages of the workflow, Apex runs the entire page description language (PDL) rendering process – typically a PDF – natively on the GPU. The result is not incremental improvement, but a step change. It produces real-world performance gains of 10–30 times faster, compared to high-end CPUs.

Crucially, this approach changes the system architecture. With rendering handled on the GPU, the CPU is freed to manage other tasks or to render additional jobs in parallel. Many modern CPUs already include integrated

GPUs, unlocking extra performance at no additional hardware cost. For OEMs seeking even greater throughput, adding a discrete GPU, often for a few hundred pounds, can eliminate the need for a PC altogether.

APEX SCALES

Multiple GPUs can be used simultaneously. This can be achieved by assigning different pages to different processors or dividing a single page into bands or tiles. Built on Vulkan and supporting Apple Metal, the technology is designed to be portable across platforms, from integrated graphics to high-end discrete cards.

PRECISION MATTERS

Speed alone is not enough. As packaging becomes more visually ambitious, brand owners demand absolute consistency across substrates, presses and production sites. For this reason, Apex integrates Hybrid Software's ColorLogic colour-management technology. ColorLogic supports extended gamut printing and provides pixel-perfect colour accuracy. The simple goal is to match what the brand signs off on to what appears on the shelf, regardless of job complexity.

INTELLIGENCE IN THE LOOP

Even with powerful GPUs, there is no single 'best' processor for every job. Simple pages can sometimes render faster on a CPU,

avoiding the overhead of transferring data to and from the GPU. More complex jobs benefit enormously from GPU parallelism. Choosing incorrectly wastes time and resources.

Helix addresses this with its patented AI-powered Autotune technology. Autotune analyses each job and dynamically decides whether it should be rendered on the CPU, the GPU or a combination of both. The system adapts in real time, ensuring that every job runs on the optimal hardware without operator intervention.

"GPUs now outperform CPUs by a wide margin on highly parallel workloads"

LOOKING AHEAD

As packaging continues to evolve – becoming more connected, personalised and data driven – the demands on print systems will only increase. Tomorrow's presses will not succeed on hardware specifications alone. They will succeed because their software is fast, flexible and intelligent enough to keep pace with consumer expectations.

Helix's rebrand is less about a new name than a clear signal of intent. The goal is to sit at the core of that future, enabling OEMs and converters to respond to change, with smarter systems, not more complexity. In an industry where packaging is starting to talk back, the quiet intelligence inside the press may prove to be the most important voice of all. ■

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