Fueled by universal access to high-quality cameras and the low-cost broadcasting capabilities of social media platforms, today's producers range from casual consumers sharing their passions to prosumers monetizing their craft to high-end creators producing professional, cinema-quality content.

In the fast-paced world of video production, time is critical, especially when working with demanding content and the need to deliver promptly. GPU (Graphics Processing Unit) acceleration streamlines these workflows by taking on the burden of compute-intensive tasks traditionally performed by the CPU. This shift accelerates the editing process, improving performance, and reducing turnaround time.

At its essence, a GPU can perform complex calculations more efficiently during video editing, compositing, and rendering. In comparison a CPU typically has fewer cores and a more limited capacity for simultaneous calculations.

This distinction between the capabilities of GPUs and CPUs becomes particularly relevant when working with high-resolution content, such as 4K or 8K videos. These formats necessitate exceptional computational power, a demand GPUs can fulfill more adeptly than CPUs. By offloading this computational demand to the GPU, the CPU can focus on other tasks, thereby enhancing overall system performance and facilitating quicker project completions.
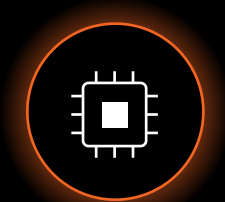
Compute Units: individual processing units within a GPU that perform computations and execute tasks in parallel. In video production, Compute Units matter to video producers because they directly impact the GPU's performance and ability to handle complex computational tasks efficiently.

Ray Accelerators: specialized components within a GPU architecture designed to accelerate ray tracing calculations, a technique used in realistic rendering and lighting simulations. In video production, Ray Accelerators matter because they enable fast and efficient rendering of complex lighting effects, reflections, and shadows in 3D scenes.

AMD Infinity Cache™ technology: a feature in the AMD RDNA™ GPU architecture that utilizes a large on-chip cache to store frequently accessed data. AMD Infinity Cache technology matters in video production because it improves memory access and data transfer speeds, resulting in fast rendering and playback of video content. By effectively utilizing the cache, video producers can experience smoother editing workflows, low loading times, and excellent overall performance when working with large video files and complex visual effects.

AMD RDNA™ architecture: AMD RDNA is the name of the architecture developed by AMD for AMD Radeon™ GPUs. It provides high performance, power efficiency, and advanced features for video producers. It includes hardware acceleration for video codecs, supports high-resolution content[1], and enables GPU-accelerated workflows, enhancing video production capabilities.

VRAM: Video Random Access Memory is a specialized memory on a graphics card that stores and processes video and graphics data. It is crucial for video producers because it directly affects the cards performance in handling video tasks. Having ample VRAM allows for smoother playback, faster rendering, support for high-resolution content, and advanced video effects, enhancing overall efficiency and quality in video production workflows.
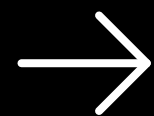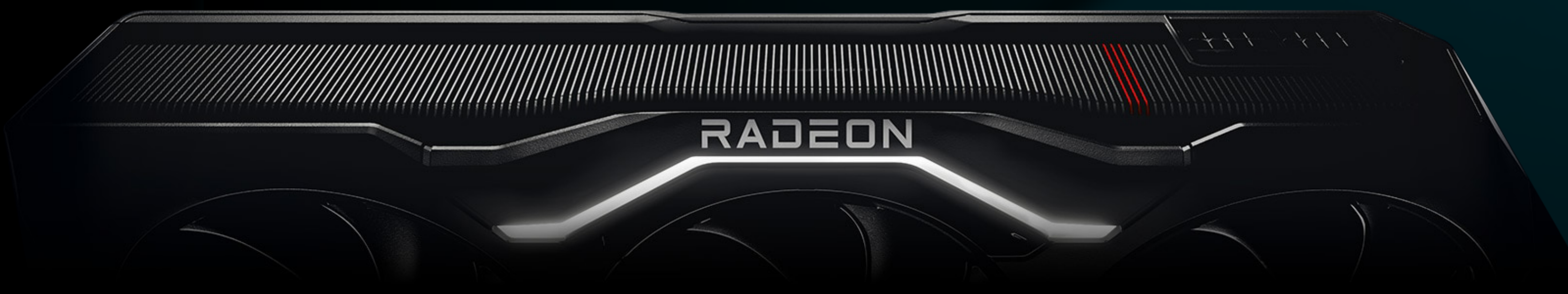
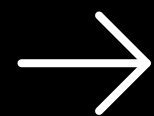**Mike Griggs**
Digital Content Creation Artist & Consultant

"AMD GPUs' sheer computational power gives artists more creative freedom by eliminating technical limitations."

Mike Griggs, a veritable Swiss army knife of video production, launched his career in 1995 as a trained interior architect before moving into the realms of museum, exhibition, and early web design. Over a decade ago, Griggs embarked on a freelance journey, focusing primarily on digital content creation, which saw him heavily involved in computer animations. His association with 3D World Magazine saw him contribute on a tutorial level, and his long-standing relationship with AMD has had him involved in content creation for about eight years. Today, he works with a wide range of companies, embodying a multifaceted role in video production.

His experience and a keen interest in technological advancements have led him to recognize the impact of GPU acceleration in video editing workflows. His experience with a wide variety of applications, including Adobe® Premiere® Pro, DaVinci Resolve™ and Cinema 4D™, also demonstrates the value of a new-generation of GPUs from AMD in handling complex workflows. Griggs emphasizes the ability of modern GPUs to simultaneously manage tasks that would previously have required multiple workstations, stating, "Effectively, you've got what would've been three workstations a couple of years ago was now just one workstation."

Above all, he recognizes the critical role of time in video production, understanding that efficiency in this space expands opportunities to refine, improve, and perfect creative work. His insights into the industry and experience with AMD products provide a unique perspective on the importance and impact of GPU acceleration in modern video production workflows. We had the privilege of speaking with Mike to delve into his firsthand experiences with AMD GPUs and how they have transformed his video production processes.

RADEON

"COLOR GRADING GOES BEYOND MERELY NUMERICAL ADJUSTMENTS - IT'S AN ART"

Visual Effects

The role of AMD GPUs in visual effects (VFX) work is profound, given the complex and computationally intensive nature of these processes. As VFX often involves generating and manipulating millions of individual pixels, AMD GPUs, with their robust architecture, facilitate faster render times and smoother preview playback. As Mike Griggs stated, "AMD GPUs' sheer computational power gives artists more creative freedom by eliminating technical limitations."

Powered Up Plugins

Numerous tools and plugins benefit from the power of AMD GPUs. For instance, in Premiere Pro, plugins like Maxon's Red Giant Universe or Boris FX Sapphire use GPU acceleration to offer smooth, real-time previews of effects. Likewise, DaVinci Resolve's Fusion node-based compositor also reaps the rewards of AMD GPU acceleration, expediting render times and providing real-time previews for even the most intricate compositions. "Basically, all of that is going to be integers faster than it ever was on older systems," Griggs stated.

Griggs's sage advice underscores the necessity of regularly updating AMD Radeon™ GPU drivers, the vital bridge between hardware and software. Outdated drivers might only partially exploit the GPU's potential while dedicating enough resources to GPU-intensive tasks can avert bottlenecks that might hinder the GPU's efficiency.

Working with 4K

4K content has four times the pixels of Full HD or 1080p, which translates to larger file sizes and increased demand on system resources. With their high memory bandwidth and many processing cores, AMD GPUs can efficiently handle these larger datasets, enabling smoother editing and quick rendering of 4K content.

Maximizing AMD GPU acceleration when working with 4K is not just about adjusting software settings. Hardware considerations are also critical. Ensuring your system has enough storage space for 4K files and sufficient RAM to handle the increased data load can help prevent system bottlenecks that could hamper the performance of your AMD GPU.

As screens evolve and HDR workflows become the norm, Griggs suggests there will be an increasing need for GPUs designed to handle this burgeoning amount of information. He predicts, "Just because I can't fill up a 48 gig card today doesn't mean that in three years I'm not gonna be going, 'Right, I need a 96 gig card.'"

GPU-Accelerated Color Grading

GPU-accelerated color grading using AMD GPUs is a game-changer in video editing and visual effects. As Mike Griggs underlines, color grading goes beyond merely numerical adjustments - it's an art.

Griggs explained the impact of this technology: "When adjusting an S curve on a color grading element and pushing it up, there's an art to it. If that is going through an AMD GPU-accelerated node in Resolve, you're adjusting the color and seeing it happen in real time. That means artistry can happen, and you flow creatively, rather than experiencing a disruptive 'chunky' delayed response."

The significance of real-time feedback in color grading becomes even more critical considering the evolution of applications like DaVinci Resolve and Premiere Pro. Specifically, Griggs mentions, "Resolve has always made the most of GPU

acceleration through its color workflow, as it was primarily a color grading application that later added editing." This emphasizes the role of AMD GPUs in turning the color grading process into a more intuitive and artist-friendly procedure, largely thanks to real-time, lag-free feedback.

GPU-Accelerated Playback & Rendering

The high memory bandwidth and numerous processing cores of AMD GPUs contribute to the smooth playback of high-resolution videos and extremely low rendering times, especially for 3D rendering that leverages parallel processing.

Mike Griggs highlights the magnitude of improvements realized in the industry. "3D rendering hugely benefits from parallel processing. We're talking about magnitudes of improvements compared to serial processing. Everything you render that can be GPU-optimized will be better. This includes 3D rendering, certain types of effects, color grading, and decoding and transcoding any video clips that the GPU acceleration can support. All of this will be exponentially faster than it ever was on older systems," Griggs explained.

Griggs's insight underscores the importance of configuring your video editing software to use the AMD GPU for rendering and playback, typically found in the software's preferences. Monitoring the GPU usage while editing or rendering videos can help identify performance bottlenecks, with tools like AMD Software: PRO Edition providing detailed information on GPU usage.
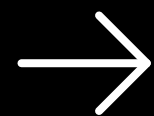
The Hidden Power of AMD GPUs

While AMD GPUs are widely recognized for their stellar gaming performance, their video production capabilities are the secret behind many of today's most productive and creative video producer's workflows, delivering an array of features designed to streamline tasks, improve performance, and boost productivity.

Powering Efficient Video Production

Considering the increasing demand for efficient video production workflows, AMD GPUs offer a variety of advantages. One standout aspect is performance. AMD Radeon™ GPUs boast features like H.264, HEVC/H.265 and AV1 encoding/decoding in hardware[1] and support for high-resolution content, directly responding to the needs of video producers grappling with time constraints and the rising demand for high-quality content.

AMD Radeon™ GPUs work seamlessly with a broad range of software applications, including Adobe® Premiere® Pro and DaVinci Resolve™.

For those working on large-scale or particularly complex projects, multi-GPU support can be an essential asset. This feature, supported for AMD Radeon GPUs, allows for the ultimate processing power, helping creators keep pace with growing project demands.

Despite these powerful features, AMD GPUs maintain a balance between performance and cost. They offer high-end capabilities that rival more expensive alternatives, making them a feasible choice for video producers working within budget constraints.

OpenCL™: A Key Ingredient in the Video Production Recipe

Another noteworthy aspect of the AMD approach to GPU acceleration is the support for OpenCL (Open Computing Language). OpenCL is an open standard for parallel computing that works across different hardware and software platforms. Its vendor-neutral nature means it's not bound to specific hardware or proprietary software, offering users greater flexibility in choosing their equipment and software tools.

OpenCL's wide acceptance among hardware and software vendors, including AMD, guarantees broad support for OpenCL-accelerated applications. This translates into improved performance and greater compatibility for AMD GPU users, thanks to AMD open-source drivers, which developers can optimize for specific applications.

The use of open standards like OpenCL reflects AMD's commitment to empowering video producers with efficient, flexible, and cost-effective solutions. In an industry where project demands and consumer expectations are continuously escalating, AMD GPUs stand ready to help creators meet these challenges head-on. They offer video producers the tools to realize their creative vision, providing a blend of performance, compatibility, and affordability that can make all the difference in video production.
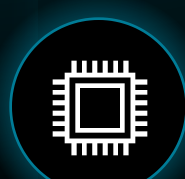
AMD GPUs offer compelling benefits for users of Adobe® Premiere® Pro and DaVinci Resolve™, enhancing application performance and improving workflow efficiency. AMD GPUs are crucial to any high-performance video editing setup, providing accelerated encoding and decoding, multi-GPU support, full OpenCL compatibility, and reliable software support.

Accelerated Encoding and Decoding for Smooth Performance

Modern video production frequently employs formats like H.264 and HEVC/H.265, renowned for their balance of quality and compression. AMD Radeon™ GPUs support built-in hardware encoding and decoding for these popular formats[1]. The GPU acceleration of these tasks results in fast export times and incredible performance, which can be a significant asset when working with tight deadlines and handling large amounts of high-resolution content.

Reliable Compatibility and Updated Support

Compatibility is a cornerstone of efficient video editing workflows. AMD Radeon GPUs are designed so that users enjoy reliable, consistent performance with frequent driver updates to maintain compatibility with the latest software versions of Adobe® Premiere® Pro and DaVinci Resolve™. This commitment is so that video editors can focus on their creative process, secure in the knowledge that their hardware and software are working harmoniously to support their efforts.

OpenCL™ Support: Optimized Graphics Processing

AMD Radeon GPUs have robust support for OpenCL, the cross-platform open standard for graphics processing acceleration. Both Adobe® Premiere® Pro and DaVinci Resolve™ are compatible with this standard, making AMD Radeon GPUs an excellent choice for enhancing graphics processing in these applications. This compatibility is key to improving software performance and maintaining smooth workflows, which is especially important when dealing with high-resolution content and complex video effects.

Streamlining Encoding and Decoding in the Video Production Workflow

Video production relies heavily on the intricate choreography of encoding and decoding, turning raw video footage into a format ready for storage, streaming, editing, and viewing. The process is computationally intensive and can bottleneck the production workflow. With GPU acceleration, this task becomes more efficient and faster, which could make a world of difference for content creators, from the passionate YouTuber to the dedicated professional.
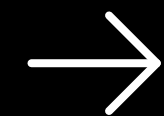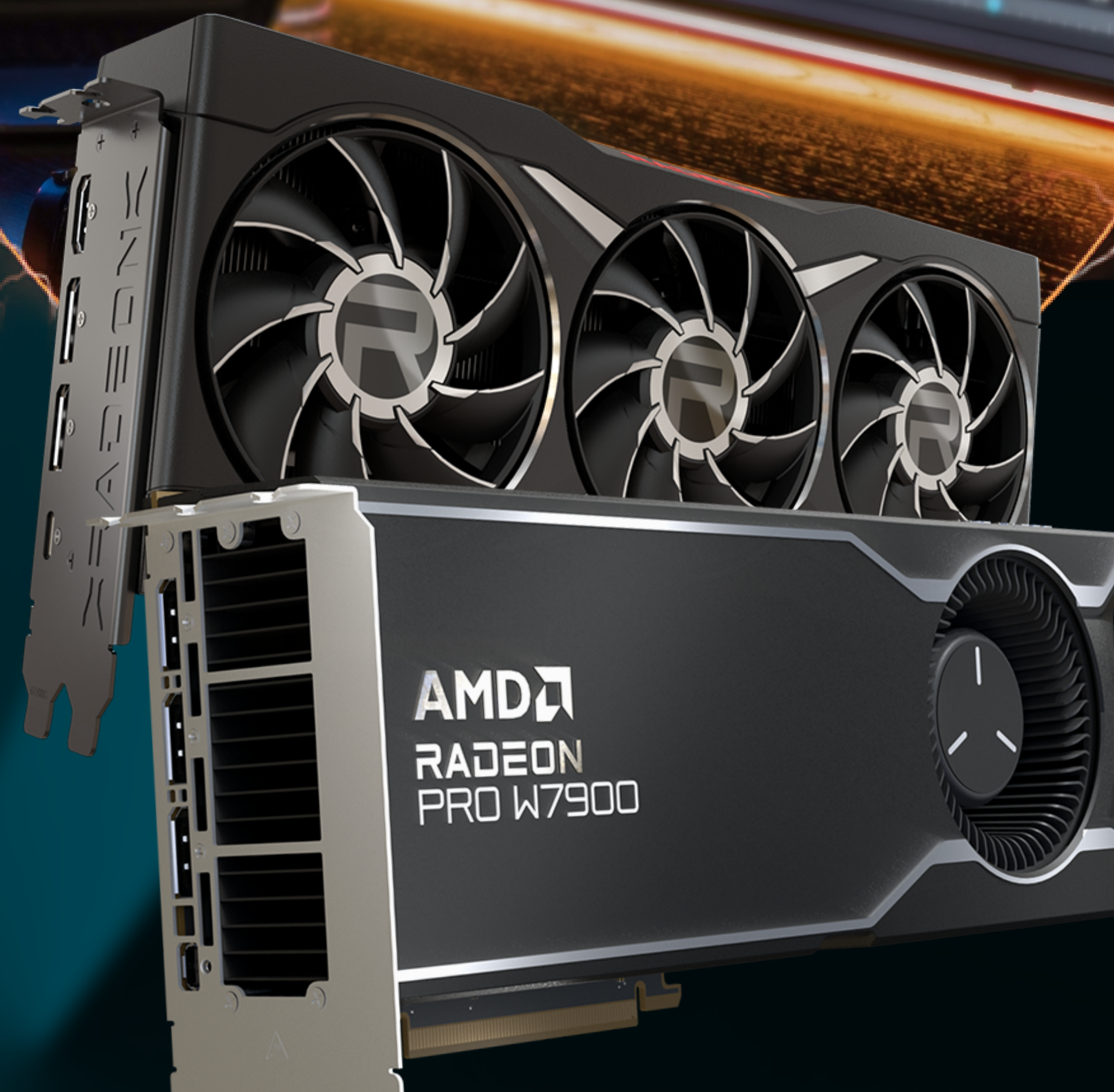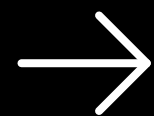
Navigating Encoding Formats: H.264, HEVC/H.265, and AV1

While encoding and decoding are integral to video production, the choice of encoding format plays a vital role in influencing the efficiency of these processes. Common video formats used today are H.264, HEVC/H.265, and AV1. The H.264 format is widely adopted due to its excellent compatibility across platforms and devices, but it demands more storage and bandwidth than newer formats. On the other hand, HEVC/H.265 delivers superior compression efficiency, reducing file sizes and bandwidth requirements without compromising the video quality. Emerging as a potential contender, the open-source and royalty-free video codec AV1 promises even higher compression efficiency than HEVC/H.265, making it the future of video streaming.

AMD GPUs offer built-in hardware encoding and decoding support for these popular video formats. This facilitates a speedier encoding and decoding process, particularly when working with software that leverages AMD GPU acceleration for these tasks, such as Adobe Premiere Pro or DaVinci Resolve. This hardware support accelerates workflow for content creators, allowing them to turn raw video into the desired format fast.

Optimizing Workflows with AMD GPU Acceleration and Video Coding Engine

AMD GPUs' Video Coding Next (VCN) engine is a dedicated hardware encoder and decoder. By leveraging this feature, the encoding and decoding calculations can be handled efficiently, with low CPU workloads, making the process quick[1]. This results in quicker turnaround times for video encoding and decoding tasks, enabling creators to work faster and more efficiently.

Higher-end AMD GPUs, especially those based on the AMD RDNA™3 architecture, are equipped with not one but two dedicated VCNs. This accelerates encoding and decoding tasks involving two parallel high-resolution video streams, even up to 8K. Models like the AMD Radeon™ RX 7900 and AMD Radeon™ PRO W7900 Series are excellent examples of AMD GPUs with dual VCNs, amplifying their processing power and efficiency.

Imagine you've recorded some footage using a GoPro camera that encodes video in HEVC/H.265 format. You want to edit this footage and export it to a different format. Here, both VCNs would come into play. One can handle the decoding of the footage from the camera while the other manages the encoding of the output. It's this kind of efficient multi-tasking that AMD GPUs enable, helping you work seamlessly and optimally.

In summary, optimizing encoding and decoding workflows with AMD GPU acceleration can significantly improve efficiency and performance. By understanding how encoding formats impact workflow and taking advantage of the built-in encoding and decoding support offered by AMD GPUs, video creators at all levels can save time, improve the quality of their work, and adapt to the demands of the fast-paced digital content production landscape.

Recommended Graphics for Demanding Creative Projects

Powerful applications need equally powerful GPUs. AMD Radeon™ RX 7900 and Radeon™ PRO W7000 Series graphics cards are ideal for both Creators and organizations of all sizes, with solutions tailored to workloads of all types.
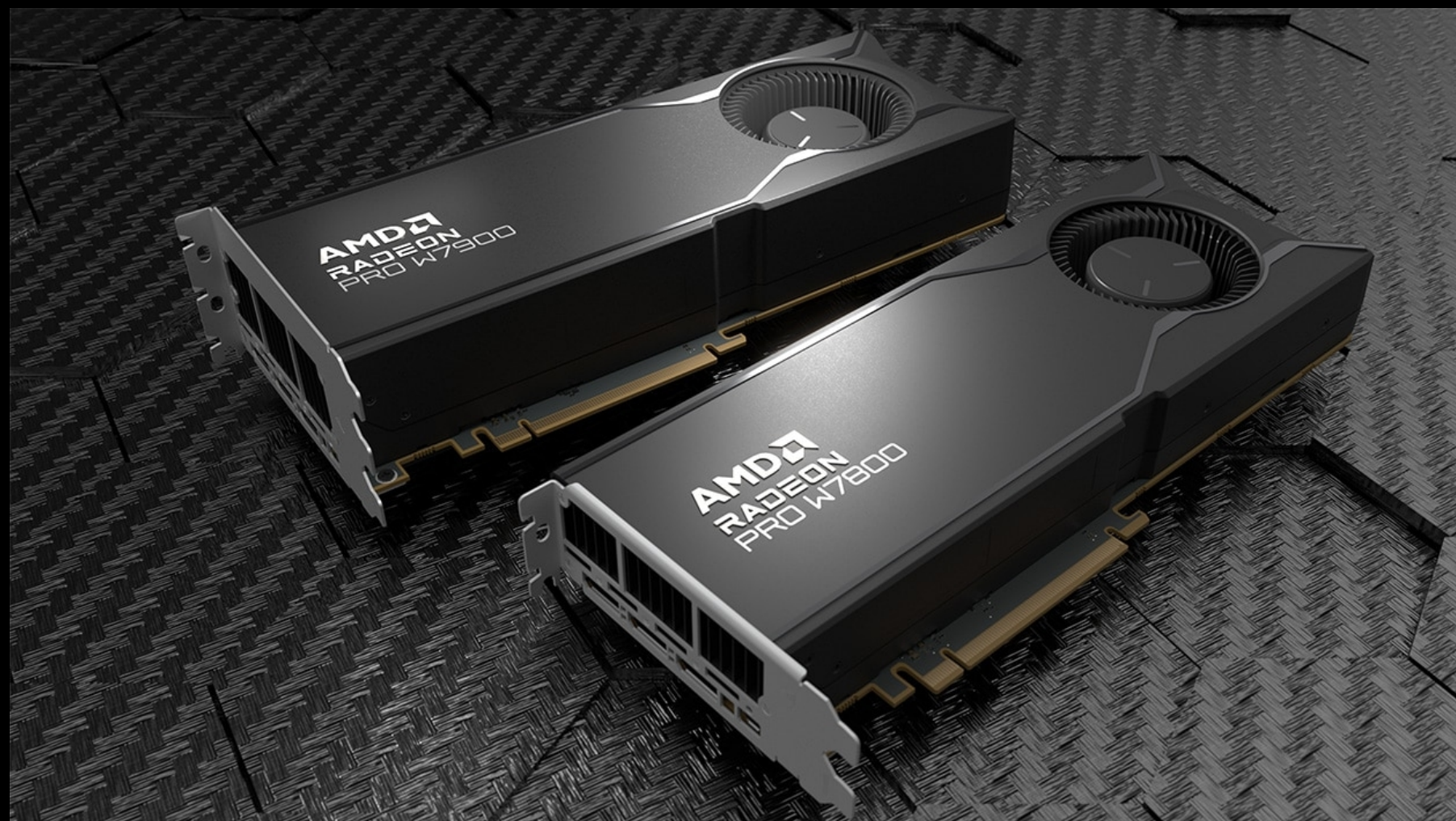

AMD Radeon™ RX 7900 XTX/XT Graphics

Ideal for:

- Heavy to extreme workloads
- Up to 24GB GDDR6 Memory
- 4x Displays (2x DisplayPort™ 2.1, 1x HDMI 2.1 & USB-C)
- Optimized and tested for many Creator applications
- Built by AMD Partners

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AMD Radeon™ PRO W7900/W7800 Graphics

Ideal for:

- Heavy to extreme Workloads
- Up to 48GB GDDR6 Memory
- 4x Displays (3x DisplayPort™ 2.1 & 1x Enhanced Mini-DisplayPort 2.1)
- Optimized, tested and certified for many Creator applications
- Built by AMD with Enterprise-grade Support

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