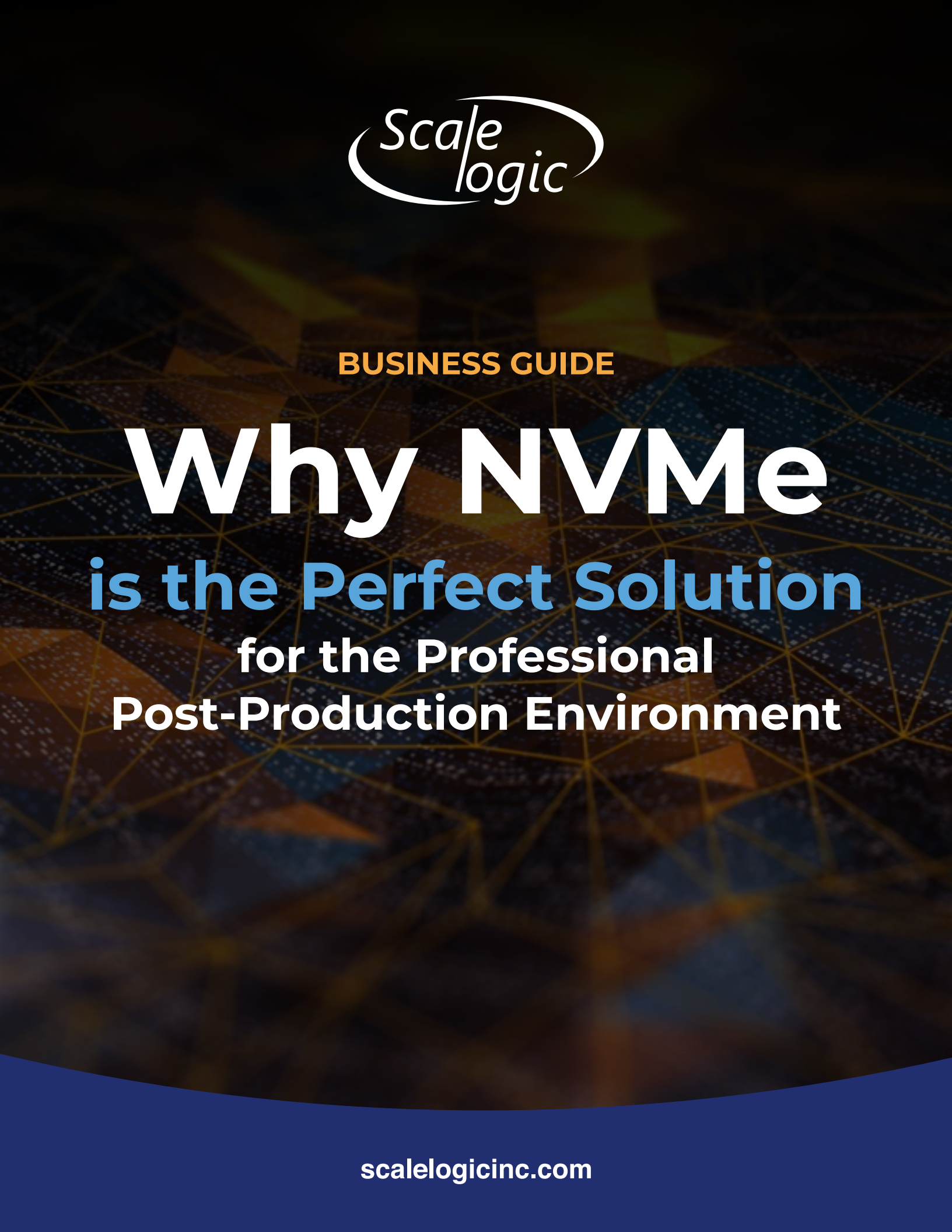

BUSINESS GUIDE

Why NVMe is the Perfect Solution for the Professional Post-Production Environment

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High Performance is the Only Option

As professional post-production teams continue to struggle with perpetual data growth, they must rethink how data is captured, preserved, accessed and transformed.

Now, creative workgroups can experience the full benefit of NVMe, enabling greater flexibility and faster data access, all while greatly decreasing production times—resulting in more cycles, more business, and more profit to the bottom line.

What is NVMe?

The concept of NVMe—also known by its long-form name, Non-Volatile Memory Express—can easily be described as revolutionary, seamlessly delivering access and transport protocols to storage for both flash and the newest solid state drives (SSDs).

Known for its ability to deliver the highest throughput and fastest response times for a wide variety of enterprise-grade media workflows, NVMe is making a significant impact on what post-production environments can do with data.

This guide will:

- Provide an overview of NVMe from a technical perspective
- Discuss the benefits this storage architecture provides over legacy protocols
- Share how NVMe is enabling businesses to do more with data than ever before

Understanding NVMe

In any industry, speed is of the essence—but especially in the media and entertainment industry, speed is everything. This is where NVMe shines. Being fully Non-Uniform Memory Access (NUMA) optimized, NVMe is high performing, easily scalable and highly optimizable—plus, it is designed to easily and seamlessly connect the host to the memory sub-system.

The primary benefits of NVMe with PCIe-based SSDs are improved scalability and latency, lower power consumption and lower costs in comparison to SAS-based or SATA-based SSDs, through the streamlining of the I/O stack.

NVMe systems deliver a massive improvement in storage performance over systems based on traditional hard disk drives (HDDs) and solid state drives (SSDs) using legacy storage interfaces including SAS3 and SATA3. The new servers are also more power-efficient than the traditional systems and have hot-plug capability for improved serviceability and availability.

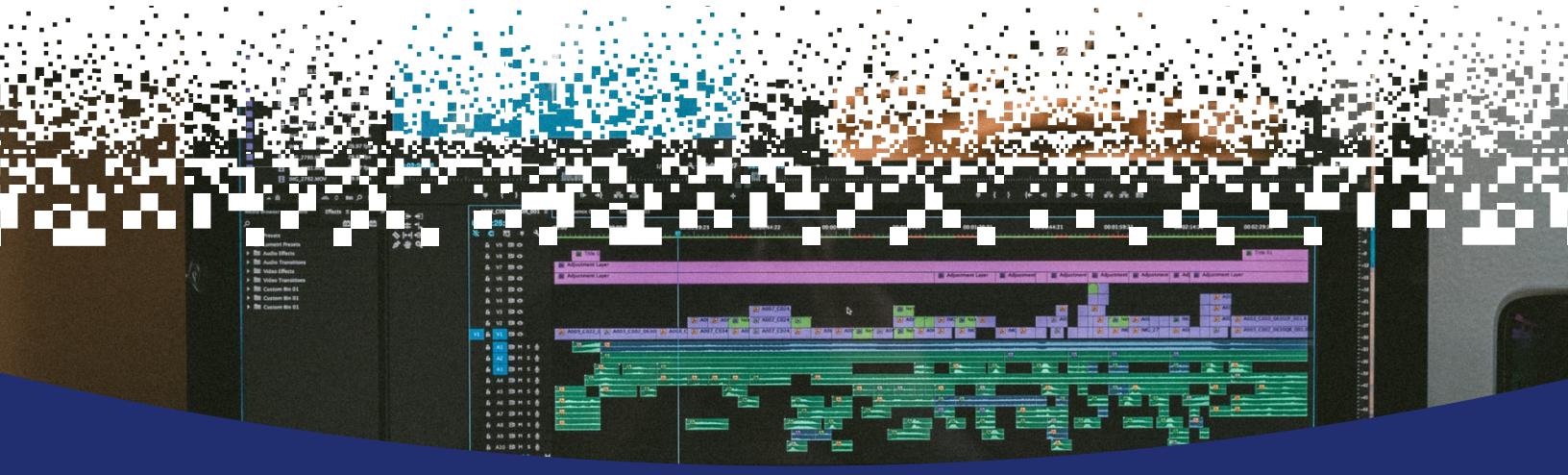
This accelerates existing post-production applications requiring high-performance workflows—and enables new applications and capabilities for real-time workflow processing in the data center and at the Edge.

How NVMe Achieves High Performance and Low Latency

Over the last decade, flash-based SSDs have transformed storage. They have been increasingly adopted across a wide variety of application workloads and tiers of storage due to their significant improvements in performance, latency and power consumption over that of traditional mechanical HDDs. While initially more expensive in comparison, the cost of flash has continued to drop—which has also contributed to the mass adoption of SSDs.

Until recently, SSDs have used SAS and SATA connectivity as their storage interface. While providing dramatic benefits over that of HDDs, when connecting SSDs through legacy storage interfaces designed for HDDs, the full potential of flash-based SSDs cannot be realized. Through host bus adapters (HBAs), SATA provides 6GB/s throughput, while SAS provides 12GB/s, in essence limiting the throughput of SSDs.

NVMe is a newer interface specification designed as a host controller interface and storage protocol for the use of SSDs directly over a computer's PCIe bus. NVMe SSDs are connected to a CPU's PCIe bus without the need for HBAs, eliminating component count, cost, and layers in the I/O stack. As a result, NVMe takes flash-based SSDs to the next level by providing up to six times more throughput, up to 70% lower latency, and lower power consumption and higher reliability. Until recently, there was a price premium for NVMe drives over that of SAS/SATA SSDs. As of early 2019, the pricing has equalized—enabling all the benefits of NVMe without forcing a cost-per-Gigabyte tradeoff.



Factors to Consider

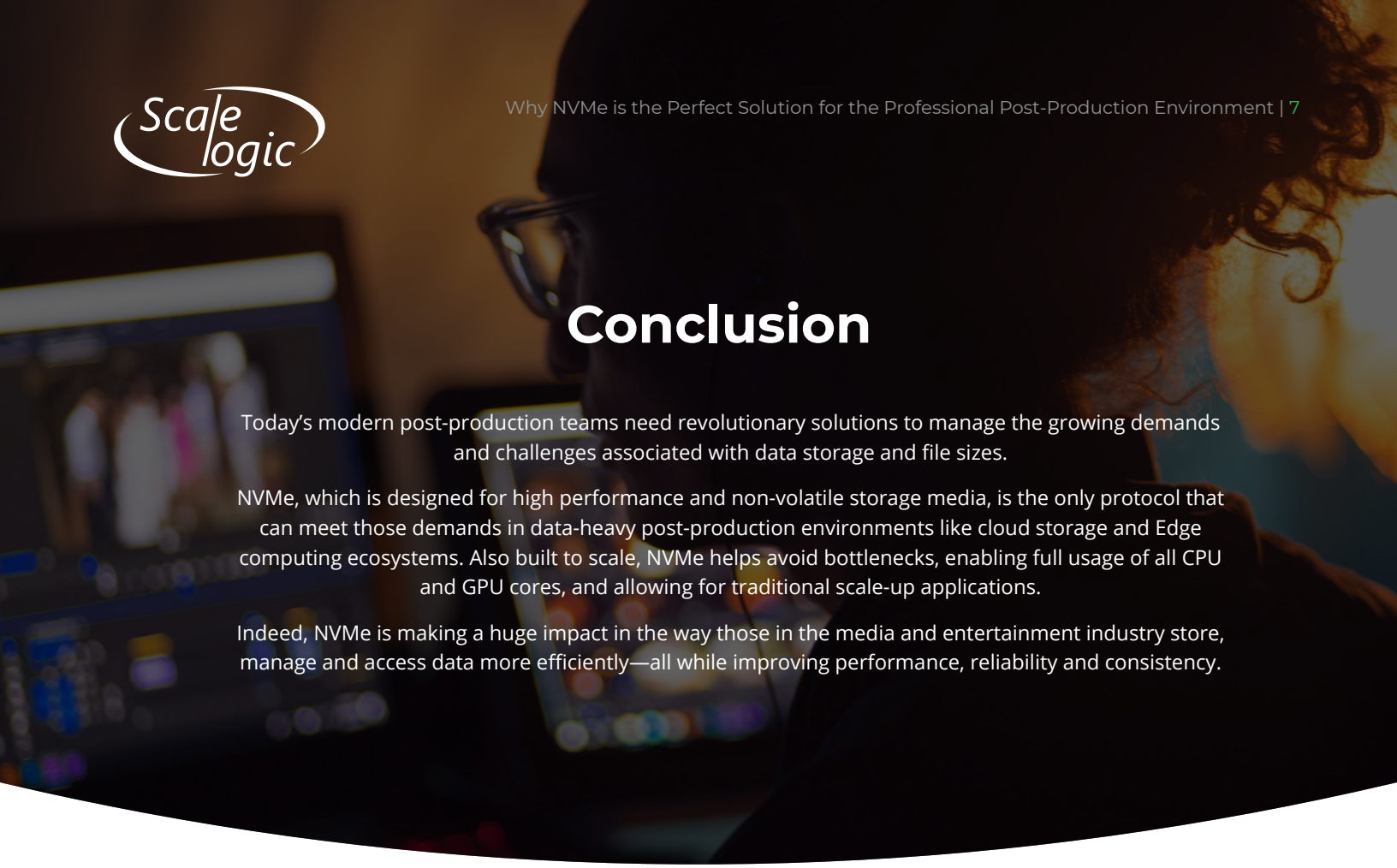
An IT infrastructure that is able to respond immediately to simultaneous user requests or answer multi-dimensional analytical queries in real time requires a combination of one or more online transaction processing (OLTP) or online analytical processing (OLAP) applications running in what is usually a highly specialized environment. The specific use case will determine the compilation of elements to some extent, but the factors to consider will include:

CPU: Choosing the right CPU is vital to ensuring optimal performance. The latest-generation CPUs, designed for real-time analytics, are able to query many terabytes of data and provide results in seconds. Features to consider include responsiveness, reliability and scalability to ensure fast, zero-downtime processing, especially for mission-critical workflows that need to be able to scale up seamlessly.

Memory: The list of advantages of using in-memory databases is growing as business demand increases. In-memory processing involves placing data in the system's RAM to provide lightning-fast response times to queries from multiple, concurrent users, and to produce instantaneous results. DDR4 (Double Data Rate 4th-generation) RAM chips support transfer rates of up to 2.4 billion transfers per second: a significant memory boost at a lower voltage than their DDR3 predecessors. Still, big workloads devour RAM. This can mean large bites are taken out of your IT budget for a system that can deliver the DRAM capacities needed.

Media Storage: Data center managers in post-production environments will tell you that storage I/O performance is invariably what causes bottlenecks. This is where flash-based storage comes into its own. NVMe, an interface specification for accessing non-volatile storage media via PCI Express (PCIe) bus, is able to provide up to 70% lower latency and up to six times the throughput/IOPS when compared to standard SATA drives.

As NVMe technology is more widely adopted, it's becoming more affordable. In some instances, the 600% boost in performance that NVMe delivers will only cost 6-7% more than a traditional SATA SSD. Flash can be introduced as capacity stores or as caching devices to improve performance, reduce latency and increase IOPS.



Conclusion

Today's modern post-production teams need revolutionary solutions to manage the growing demands and challenges associated with data storage and file sizes.

NVMe, which is designed for high performance and non-volatile storage media, is the only protocol that can meet those demands in data-heavy post-production environments like cloud storage and Edge computing ecosystems. Also built to scale, NVMe helps avoid bottlenecks, enabling full usage of all CPU and GPU cores, and allowing for traditional scale-up applications.

Indeed, NVMe is making a huge impact in the way those in the media and entertainment industry store, manage and access data more efficiently—all while improving performance, reliability and consistency.

Learn more about Scale Logic's NVMe solutions today:

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