

Game of I/Os: Disk Activity in the Real World

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The Tale of Three Users



The Gamer



Launch AAA video game

Load new levels

Stream online +
Record local copy

The Office Worker



Send and receive emails

Create presentations

Sort data +
export for reporting

The Content Creator



Organize source files

Import to project

Edit + manipulate
for final publishing

The Problem with One Spec



One number only tells one part of the product story.

Worse yet, it might tell the wrong story altogether.

The "Performance Number"

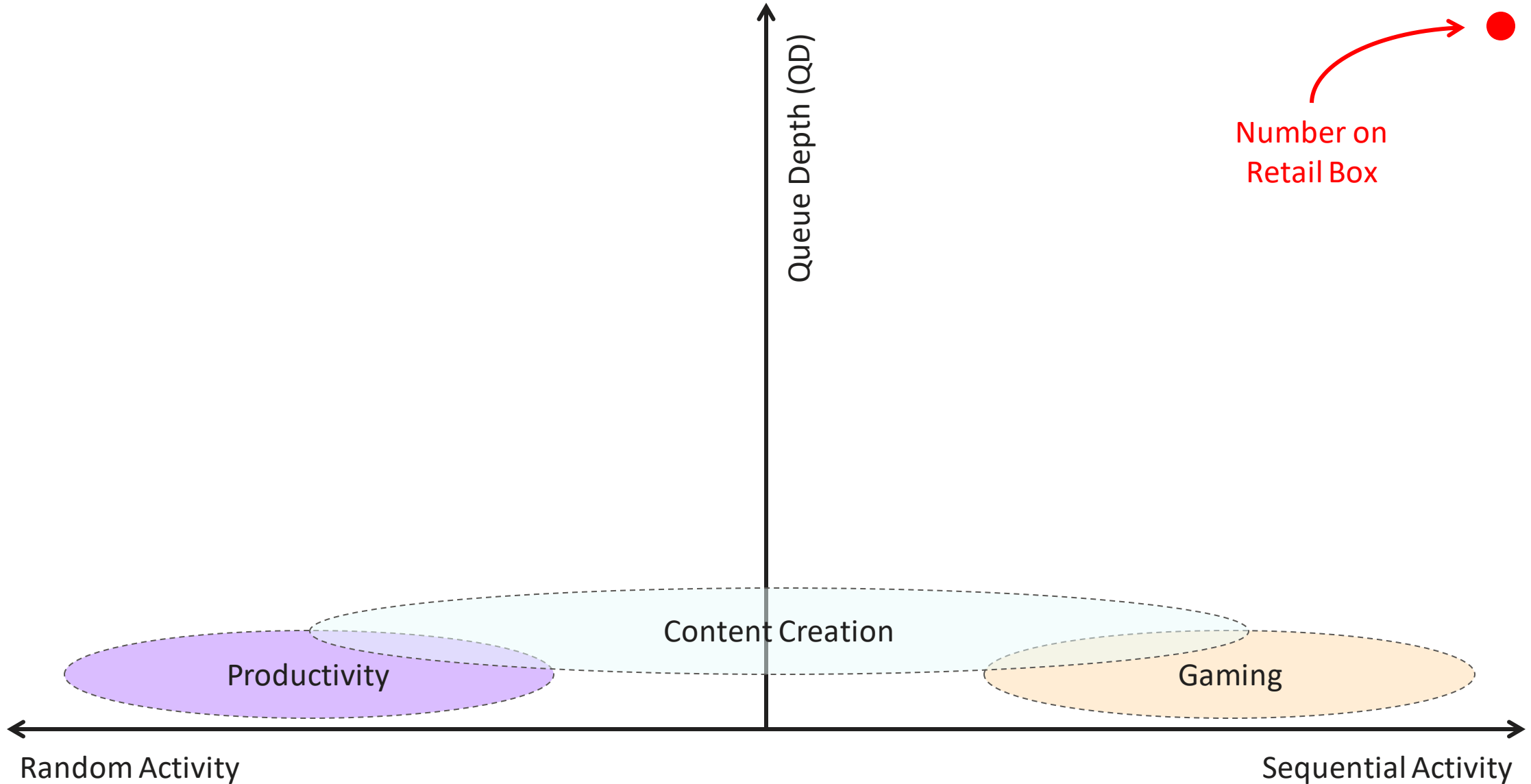
Buying on the “Performance Number” Alone



Top Speed: 360km/h

But what about fuel economy?
Street handling? Safety? Parking?

Performance: Need vs. Number



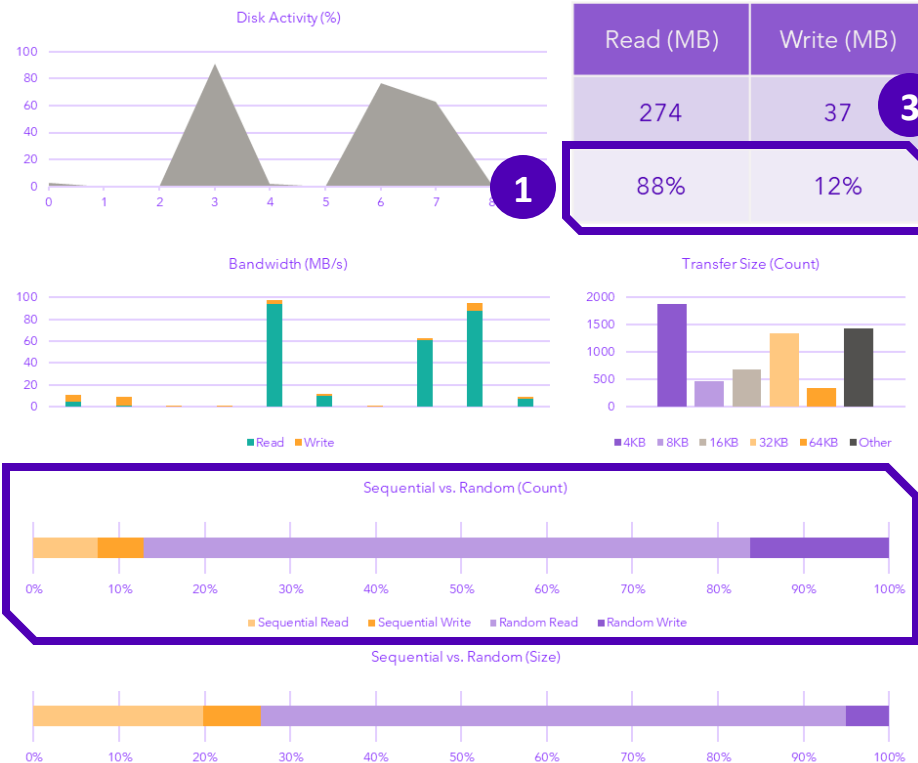
The Anatomy of a PC Workload



Launch **Adobe Acrobat** + load PDF

Workload Analysis | Productivity Use Case

9 seconds, 311MB



1
Read/Write Mix
88% Read
12% Write

2
Sequential vs. Random
15% Sequential
85% Random

3
Queue Depth
Mean: 2.1

Source: Solidigm internal research

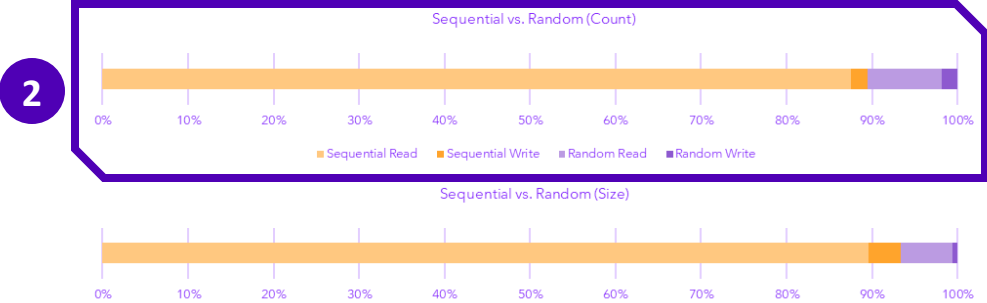
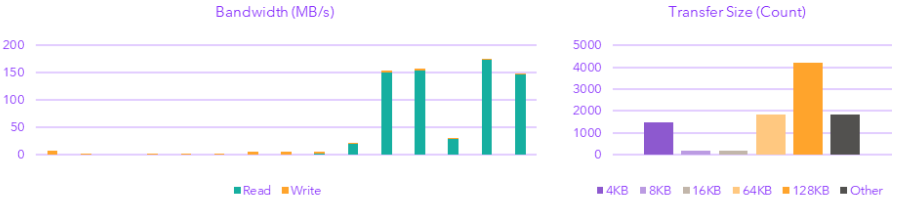
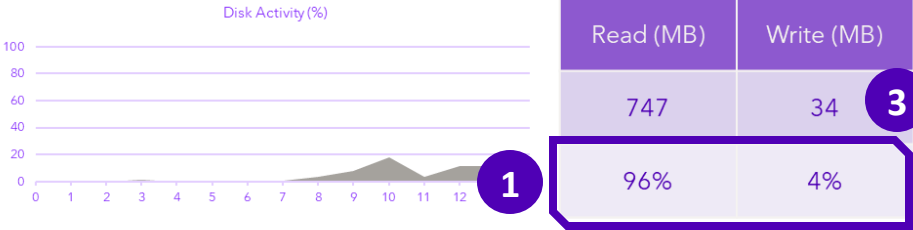
Gaming Workload



Load Elden Ring new level

Workload Analysis | Gaming Use Case

14 seconds, 781MB



I/O Attributes	Max	Mean	Notes
Queue Depth	4	1.2	98% ≤ QD2
Latency	16.2ms	0.2ms	
System Resources	Max	Mean	Notes
CPU Activity (%)	32%	15%	Per-core avg
Main Memory Usage	15.8GB	14.7GB	
GPU Activity (%)	62%	30%	
GPU Memory Usage	3.2GB	2.3GB	
Network Usage	8KB/s	2KB/s	

Source: Solidigm internal research

1

Read/Write Mix

96% Read

4% Write

2

Sequential vs. Random

89% Sequential

11% Random

3

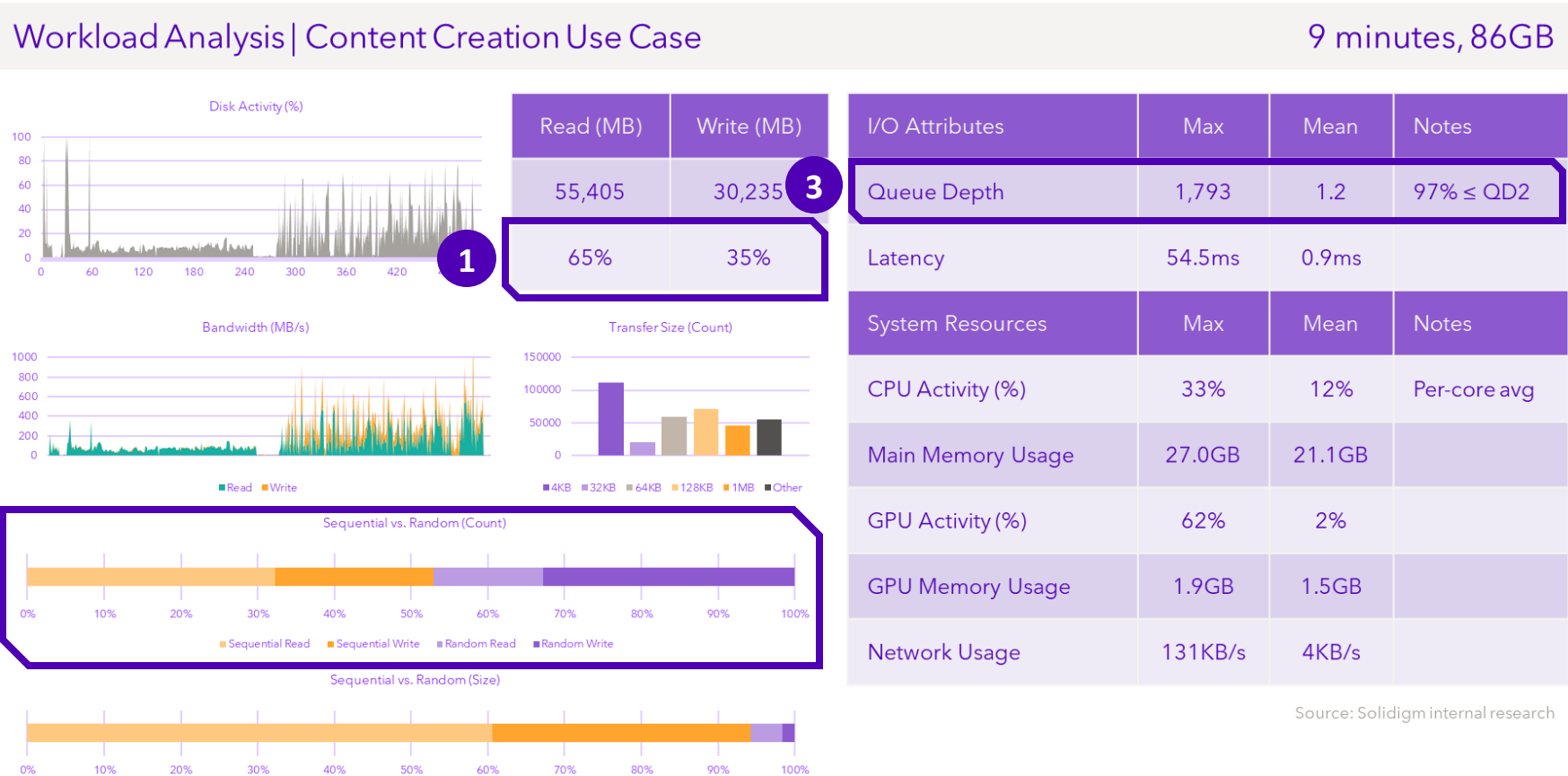
Queue Depth

Mean: 1.2

Content Creation Workload



Import 100 video clips to **Adobe Premiere Pro**



The **BIG** take away

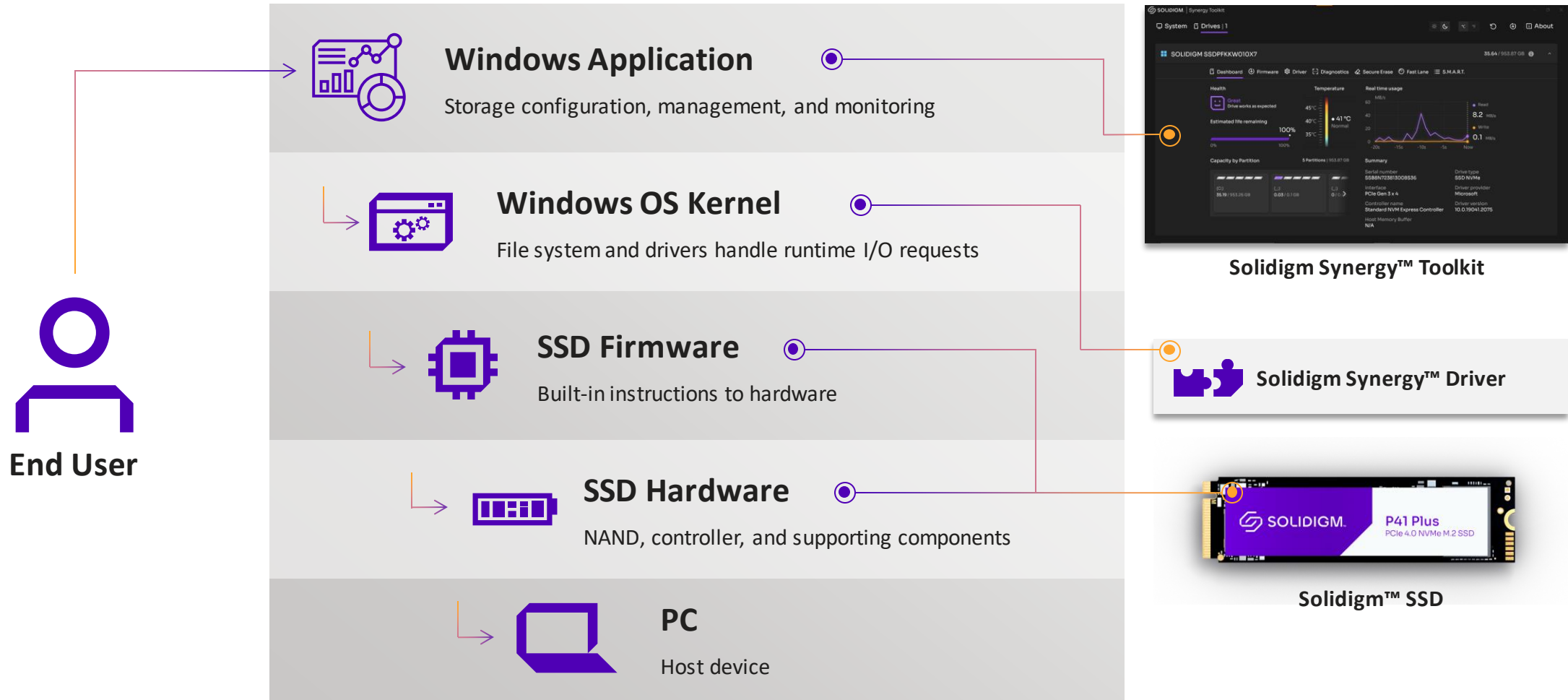


Optimizing with the primary goal of pumping front-of-the-box “performance numbers” as high as possible has **relatively little impact on real-world performance.**

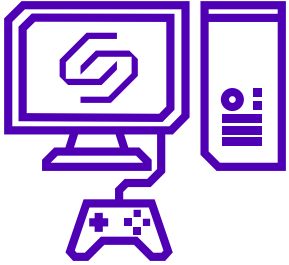
There's More to Storage Innovation



Solidigm PC Product Layers



Optimizing for Gamers



What's in a game?

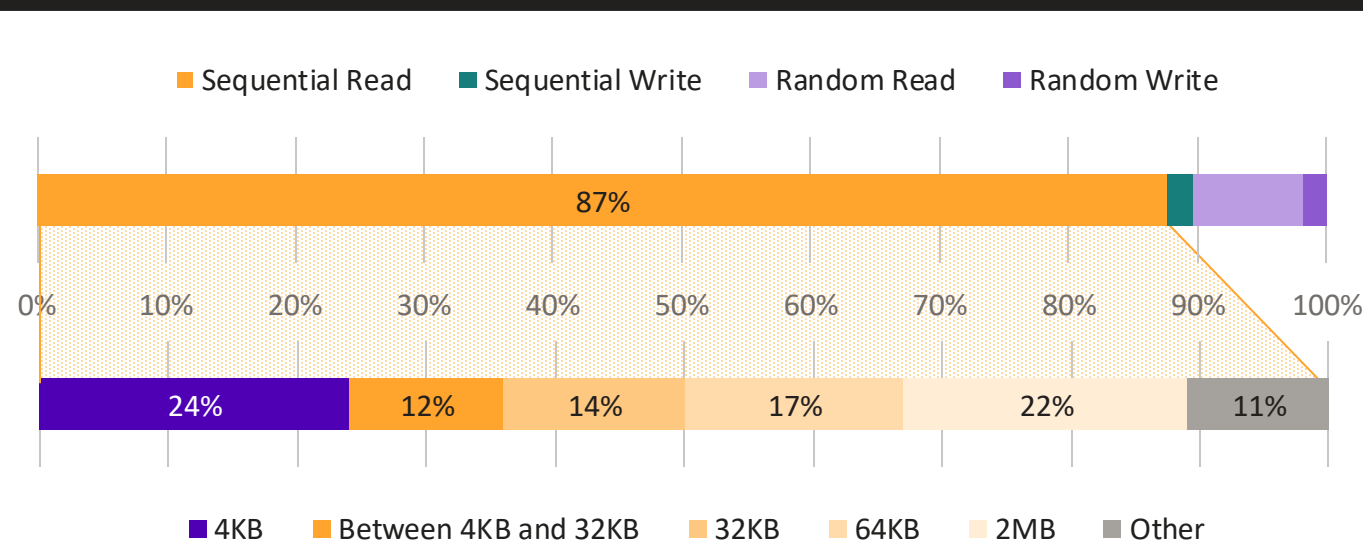
I/O activity is highly dependent on title, but tends to be:

Predominantly reads – game launch, level load, etc.

Highly sequential in nature, dealing with large assets

At very low queue depth (>90% QD 1 or 2)

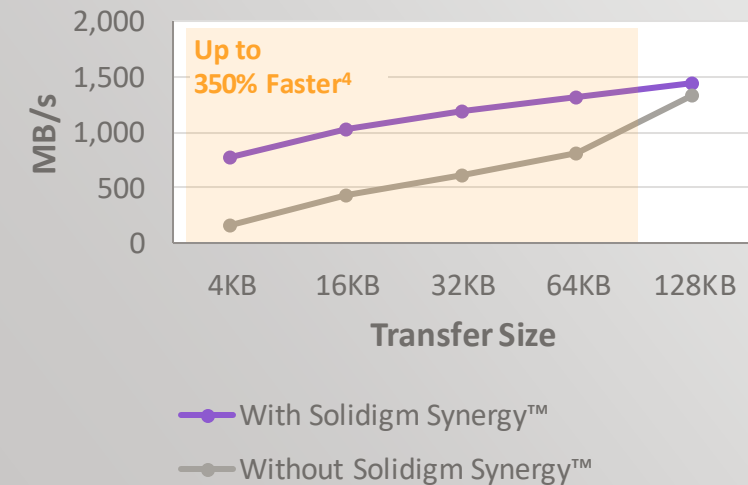
Workload Analysis: Level Load in Elden Ring (781MB)



How Solidigm Synergy™ Optimizes Game Loading

An innovation called **Smart Prefetch** works in two steps:

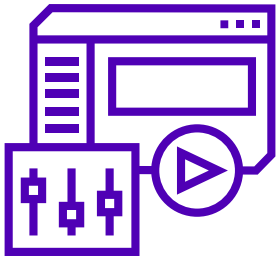
1. Identify predictable read streams (sequential with queue depth of 1)
2. Prefetch the next data in series before it's requested



* Workload analysis based on internal Solidigm research.

See appendix for performance footnotes.

Optimizing for Content Creators



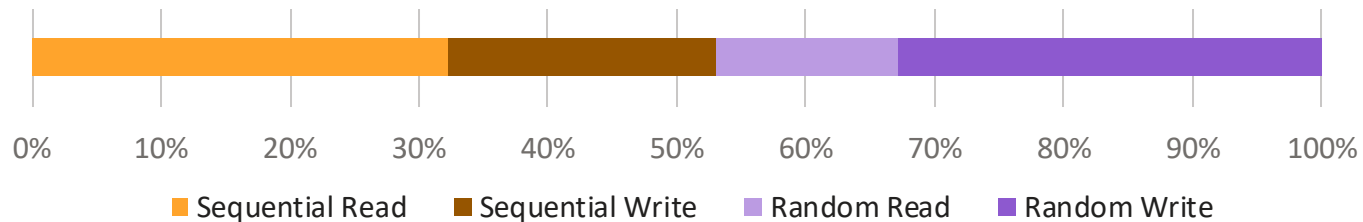
Creating puts your brain and SSD to the test.

More than other use cases, content creation involves a dynamic combination of I/O demands:

Reads and writes, depending on project phase

Sequential and random I/O, based on asset size

Analysis: Import 100 Video Clips to Adobe Premiere Pro (86GB)*



How Solidigm Synergy™ Optimizes Responsiveness

An innovation called **Dynamic Queue Assignment** works by routing I/O completions to less-occupied CPU cores, preventing a bottleneck from occurring at the CPU.



Up to
20% faster
QD32 4K random writes²



Up to

14% Faster

Microsoft PowerPoint Launch³



Up to

7% Faster

PC Boot Time⁵



Up to

7% Higher

PCMark 10 Storage Test Score⁶

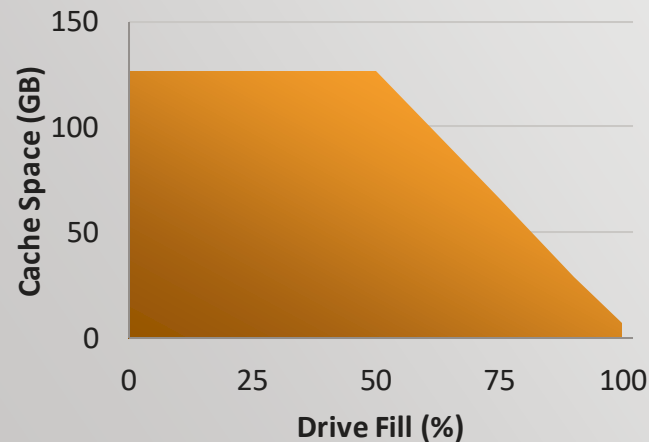
* Workload analysis based on internal Solidigm research.

See appendix for performance footnotes.

Fast Lane: Consistent Performance as Drive Fills Up

The Problem

As your SSD fills up, cache space (the “fast access” area) is reduced to make room for new data, leading to general storage slowdown.

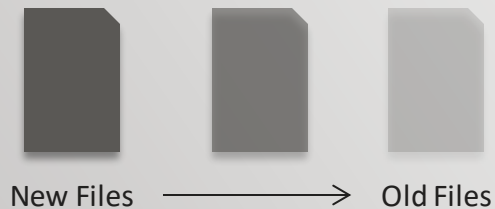


Example: Dynamic cache sizing on a 1TB SSD

The Solution

Fast Lane tracks which files and applications you use most often – and prioritizes those within the cache.

CACHING WITHOUT FAST LANE

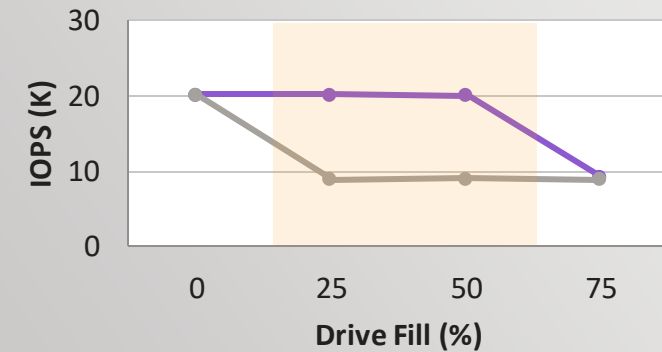


CACHING WITH FAST LANE



The Result

Access to important files and applications remains fast, even as the drive fills up and the cache shrinks.



Up to **120% Faster Reads** on a 50% Full SSD¹

See appendix for footnotes.

The Software Optimization Difference



7555.74
All Managers - Total I/Os per Second

Solidigm P41 Plus

In-box Drivers

Solidigm Synergy OFF



17859.52
All Managers - Total I/Os per Second

Solidigm P41 Plus

Custom Drivers

Solidigm Synergy ON



Come see us

Booth 107

Read more

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