

**At a Glance Guide**

**Two I/O Secrets for  
40% More  
Throughput**

**Fix Performance Problems at the Source**

## At a Glance Guide

# Two I/O Secrets for 40% More Throughput

Slows, freezes, and crashes are the biggest headaches of IT, and there is nothing worse than angry users. The faster the systems go, the better for your users.

## Windows is still Windows Whether in the Cloud, on Hyperconverged or All-flash

**Fact #1** – Windows suffers from severe write inefficiencies that dampen overall performance.

**Fact #2** – Windows is still Windows whether running in the cloud, on hyperconverged systems, all-flash storage, or all three.

No matter where you run Windows and no matter what kind of storage environment you run Windows on, Windows still penalizes optimal performance due to severe write inefficiencies in the hand-off of data to storage. Files are broken down to be excessively smaller than they need to be. Since each piece means a dedicated I/O operation to process as a write or read, this means an enormous amount of noisy, unnecessary I/O traffic is chewing up precious IOPS, eroding throughput, and causing everything to run slower despite how many IOPS are at your disposal.

## The Two I/O Myths

### #1 - The IOPS Fallacy

#### The myth:

- I have more than enough IOPS to handle the workload. Maybe you have 30,000, 100,000, or even 600,000 IOPS on an all-flash SAN and you are still missing your SLAs.

#### The reality:

- Workloads on ANY hardware platform are processing 30-40% slower than they should to be due to Split, Small, Random I/O patterns generated by the Windows O/S. This is very difficult to process.
- Sequential I/O ALWAYS outperforms Random I/O

#### The truth:

- Only a small percentage of total I/O capacity is used at any one time
- We get a false sense of performance due to high IOPS and I/O Response time ratings
- DymaxIO™ optimizes the work being done, not the spare capacity that isn't being used

## #2 – The I/O Response Time Fallacy

I/O Response time can be misleading

The myth:

- Faster I/O response time is better. It is good, but it is not the only thing.



The reality:

- You need to consider the nature and size of the I/O. One individual smaller I/O transfers faster than one individual larger I/O. If you have a 4k block or a 60k block, the 4k block is by itself going to transfer faster just because it is smaller.
- This also doesn't take into account:
  - o Split vs. Contiguous I/O
  - o Random vs. Sequential I/O



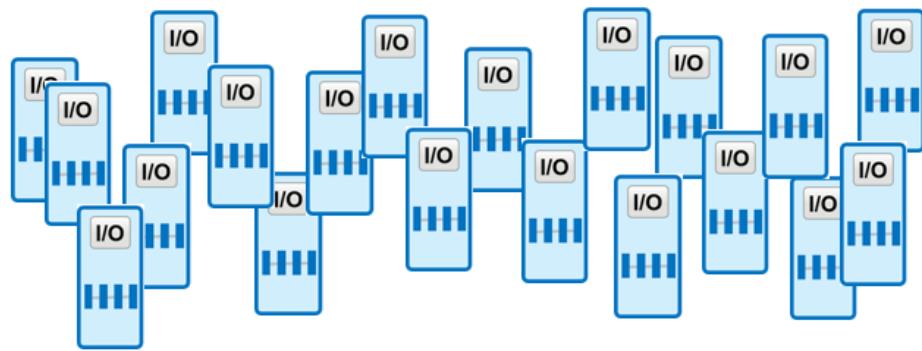
The truth:

- The individual response time of each I/O has been overprioritized in the performance analysis equation
- Overall throughput is always slower when data is transferred with Split, Small, Random I/O
- Overall throughput is always faster when data is transferred with Contiguous, Larger, Sequential I/O

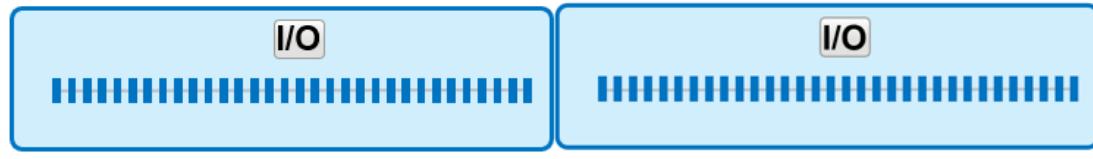
All of these pieces together contribute to your throughput potential.

## How to Recover 40%+ Throughput from your Environment on your existing hardware

Transform this:



Into this:



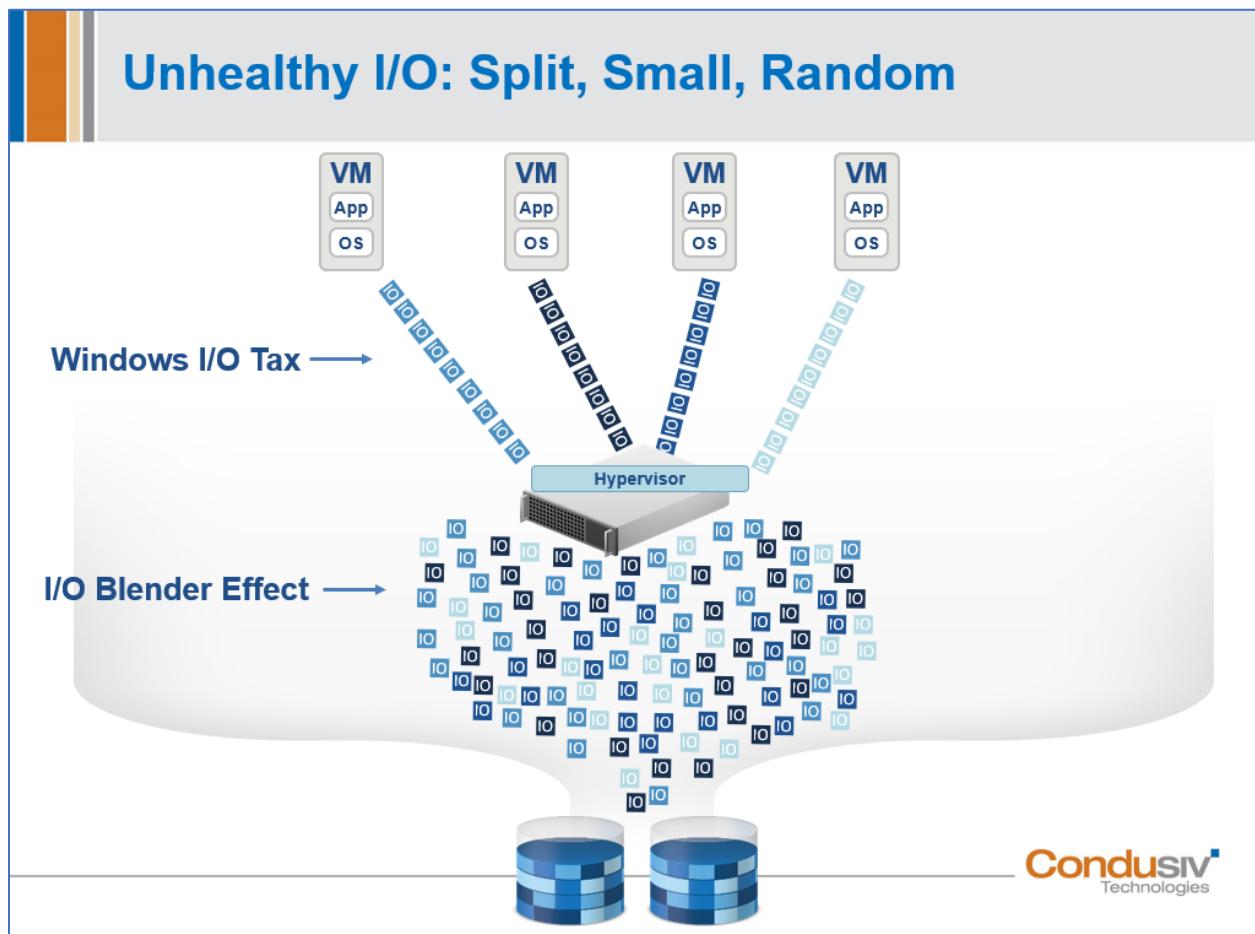
We take Split, Small, Random I/O and transform it into Contiguous, Larger, Sequential I/O. That's part of the key to getting back 40%+ of throughput. Your hardware SHOULD be able to perform faster, but the way Windows is handling the data logically... it's like Windows has its foot on the brake pedal of a Maserati. Think of DymaxIO as pressing down the accelerator.

## The Technical Details

This is a rudimentary extraction of a virtualized environment.

As great as virtualization has been for server efficiency, one of the biggest downsides to virtualization is that it adds complexity to the data path.

This is what your I/O stream ends up looking like:



There are two severe I/O inefficiencies causing this.

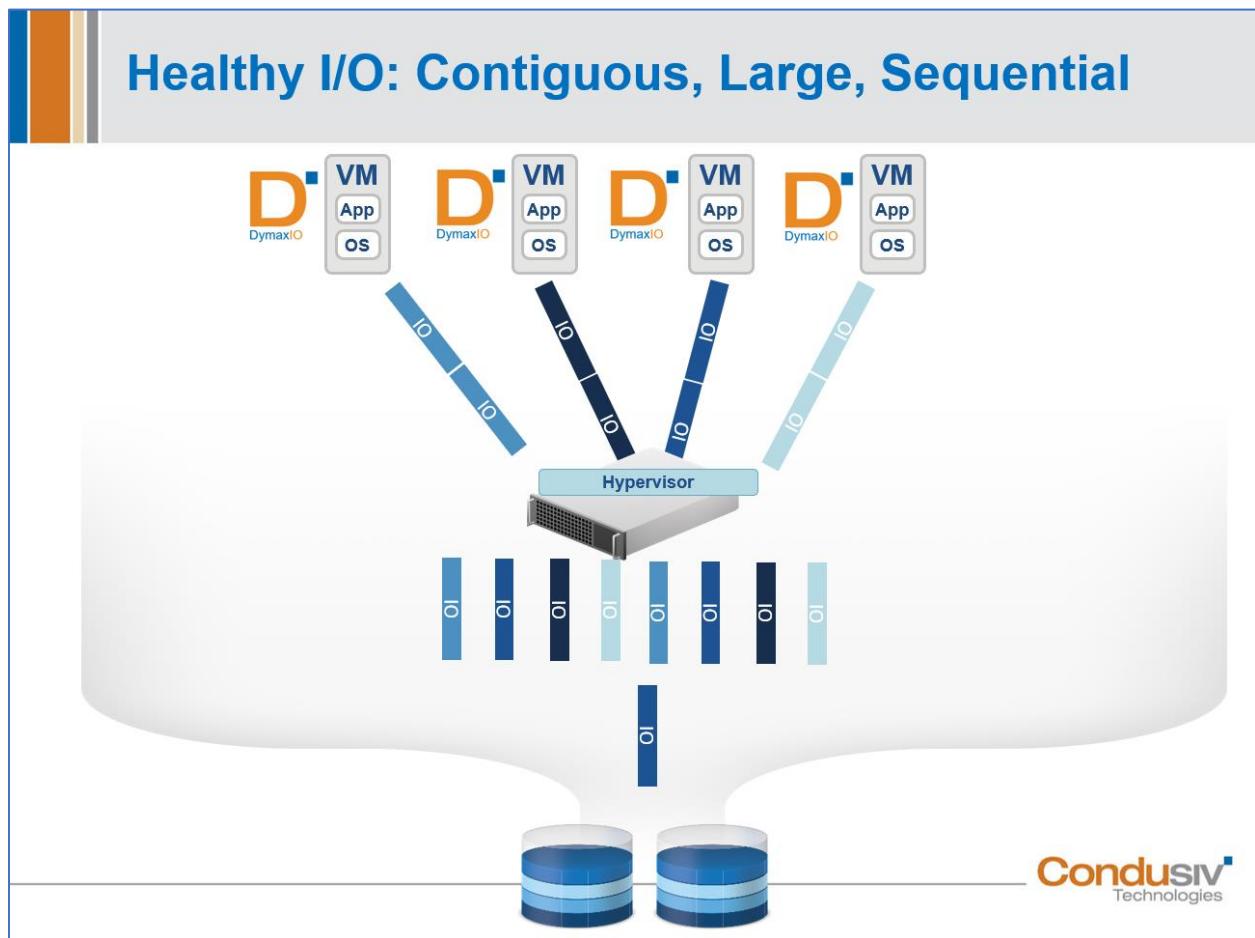
The first one is the Windows behavior that generates I/O characteristics that are much smaller, more fractured, more random than they need to be – the perfect trifecta for bad storage performance.

The second one is storage I/O contention, also known as the I/O Blender Effect, which happens when you have multiple systems all sharing the same storage resource, such as multiple VMs all sending small, random I/Os down through the same hypervisor.

Your performance is penalized twice by these storage I/O inefficiencies causing systems to process workloads about 50% slower than they should.

This is what a healthy I/O stream SHOULD look like in order to get optimum performance from your hardware infrastructure. There's a nice, healthy relationship between I/O and data. You're getting nice, clean contiguous writes and reads with every I/O operation.

There are now LARGER, FEWER, SEQUENTIAL reads and writes.

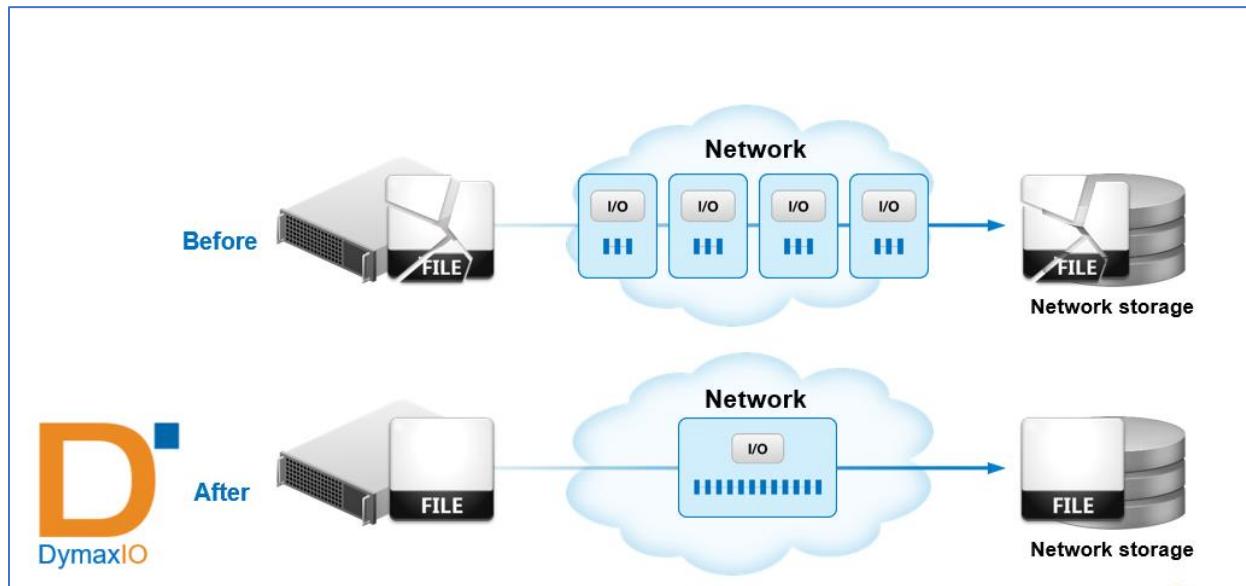


DymaxIO dynamically accelerates data for maximum I/O performance. By solving I/O inefficiencies at the source, DymaxIO improves application performance, increases throughput 40%+, reduces latency, increases VDI capacity, reduces timeouts and crashes, shortens backups, improves data transfer rates and extends hardware lifecycles.

## DymaxIO's Magic: 2 Patented Optimization Engines

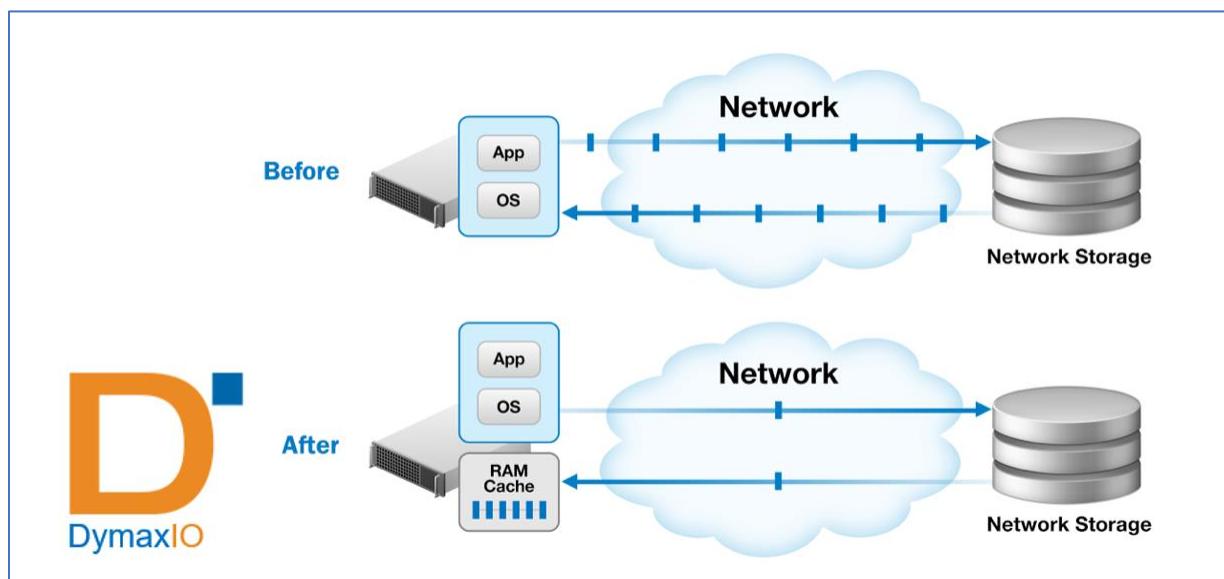
### Write I/O Reduction (IntelliWrite® patented technology)

Eliminate small, fractured files caused by the Windows OS splitting files into multiple write operations. Eliminating I/O traffic from going to storage is what it's all about. The fewer I/Os to storage, the faster and more data your applications will be able to access.



### Read I/O Reduction (IntelliMemory® patented technology)

Reduce read I/O from storage by caching hot data server-side. Tier-0 DRAM read caching engine eliminates hot reads from traversing the full stack from storage by serving it straight from idle, available DRAM, which is 15X faster than SSD.



## **Steps to Increase Throughput 40%+:**

1. [Download Free 30-day trial of DymaxIO.](#)
2. Install on any virtual server or physical server, no reboot required. For best results, ensure you have enough available free memory (at least 4GB) and give the software 24-hours for algorithms to adjust.
3. After a few days in production, open the DymaxIO dashboard to view results. If fewer than 50% of I/O traffic is offloaded from storage, just add more memory to see those numbers rise and watch performance problems disappear.
4. If testing on MS-SQL, add up to 16GB of DRAM for blazing results then cap SQL memory usage leaving the additional memory leftover for the OS and DymaxIO. If no additional memory is available, cap SQL memory usage leaving 8GB for the OS and DymaxIO.
5. Optimum results will not be achieved unless (1) systems have adequate memory and (2) the software is installed on each VM on the same host to get the optimal benefits. Since each Windows VM generates a minimum of 30-40% unnecessary I/O traffic, it is imperative to install DymaxIO on all the VMs on the same host. If installing on 10+ servers, simply request the centralized management console from [sales@condusiv.com](mailto:sales@condusiv.com) to push the software out to as many servers as desired. A Condusiv SE can also assist with deployment.
6. [Buy a subscription of DymaxIO for all of your Windows systems.](#)

References and Links:

1. [Video: The Two IO fallacies](#)
2. [Article: Windows is still Windows Whether in the Cloud, on Hyperconverged or All-flash](#)
3. [Webinar: Two I/O Secrets for 40% More Throughput](#)
4. [DymaxIO Datasheet](#)
5. [DymaxIO Free Trial](#)
6. [Contact Us](#)