BURST
A DATA PERFORMANCE COMPANY

# Cloud Storage: Delivering on a performance priority

SoftNAS-EFS Performance Report

# Introduction

## Cloud Storage Performance Overview

One of the top priorities for Cloud architects is achieving high performance from applications. As we move more applications to the cloud, CPU, RAM, and fast networks are plentiful. However, storage rises to the top of the list as the cause for Cloud application bottlenecks.

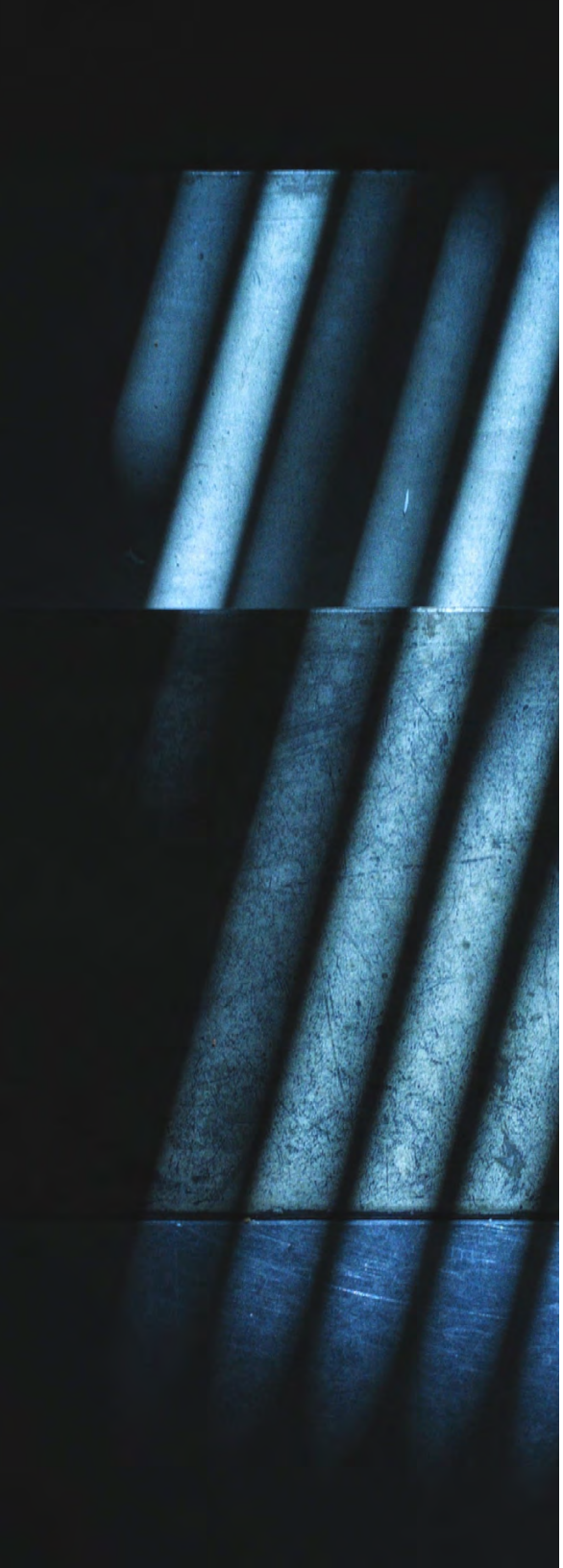
**SoftNAS:**

Up to 23x faster than AWS EFS

### The Big Takeaways

- Implement a Cloud NAS for predictable storage performance.
- Utilize caching (L1 & L2) to increase cloud storage performance.
- Pay for performance for storage, not storage for performance.
- Tune storage performance by implementing a cloud NAS to:
  - Configure a dedicated Cache per storage volume
  - Increase Throughput and IOPs
  - Decreasing Latency
- EFS performance is better when capacity increases. Cloud NAS performance is consistent at any capacity.

This eBook offers recommendations to increase storage performance for both managed storage services such as EFS, Azure Files, and self-managed storage using a Cloud NAS.



# Managed Service Cloud Storage

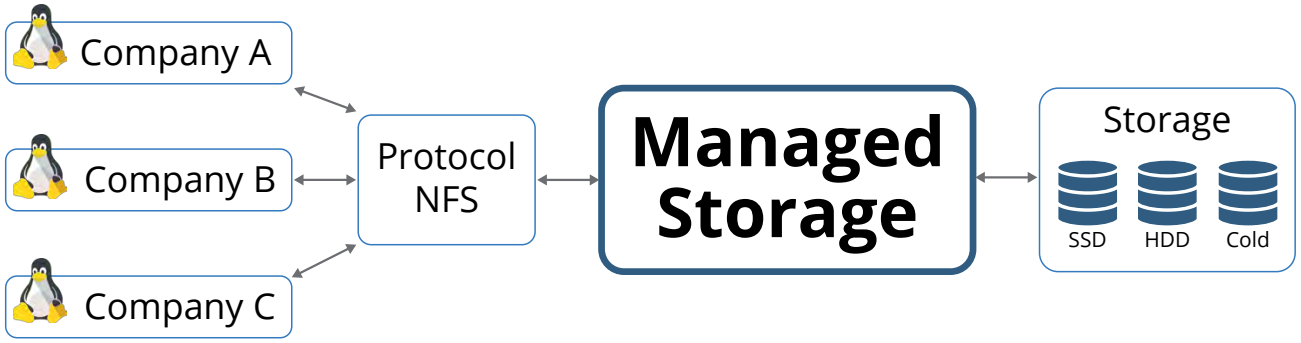
Many cloud architects have turned to managed cloud file services for cloud storage – such as AWS EFS, FSx, or Azure Files – so they do not have to worry about the storage infrastructure. However, when using managed storage, constraints are applied to the data access in order to deal with the thousands of customers accessing storage.

## Throttled Bandwidth Slows Performance

Thousands of customers may be accessing storage through the same managed storage gateway. Managed storage services deliberately throttle bandwidth to prevent one company from using all the Throughput. The result is an inconsistent performance.

## Buying More Capacity – Storing Dummy Data

To increase performance, users of managed storage services are forced to purchase additional storage capacity they will never use. Many companies store dummy data on the file shares, therefore paying for more storage and achieving the performance needed for their application. Or, they can pay an additional premium price for provisioned Throughput or provisioned IOPS.



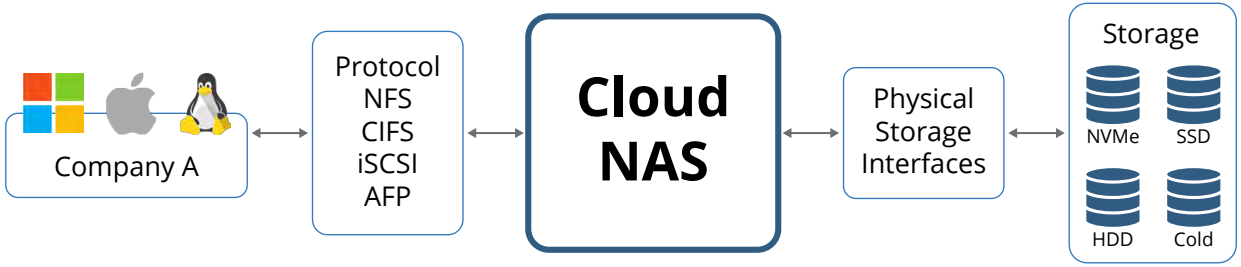

# What Are You Paying For?

# More Capacity or Actual Performance?

# Cloud NAS Storage

## How a Cloud NAS Improves Performance

A Cloud NAS has direct connectivity to cloud block storage and provides a private connection to clients owned by your organization.



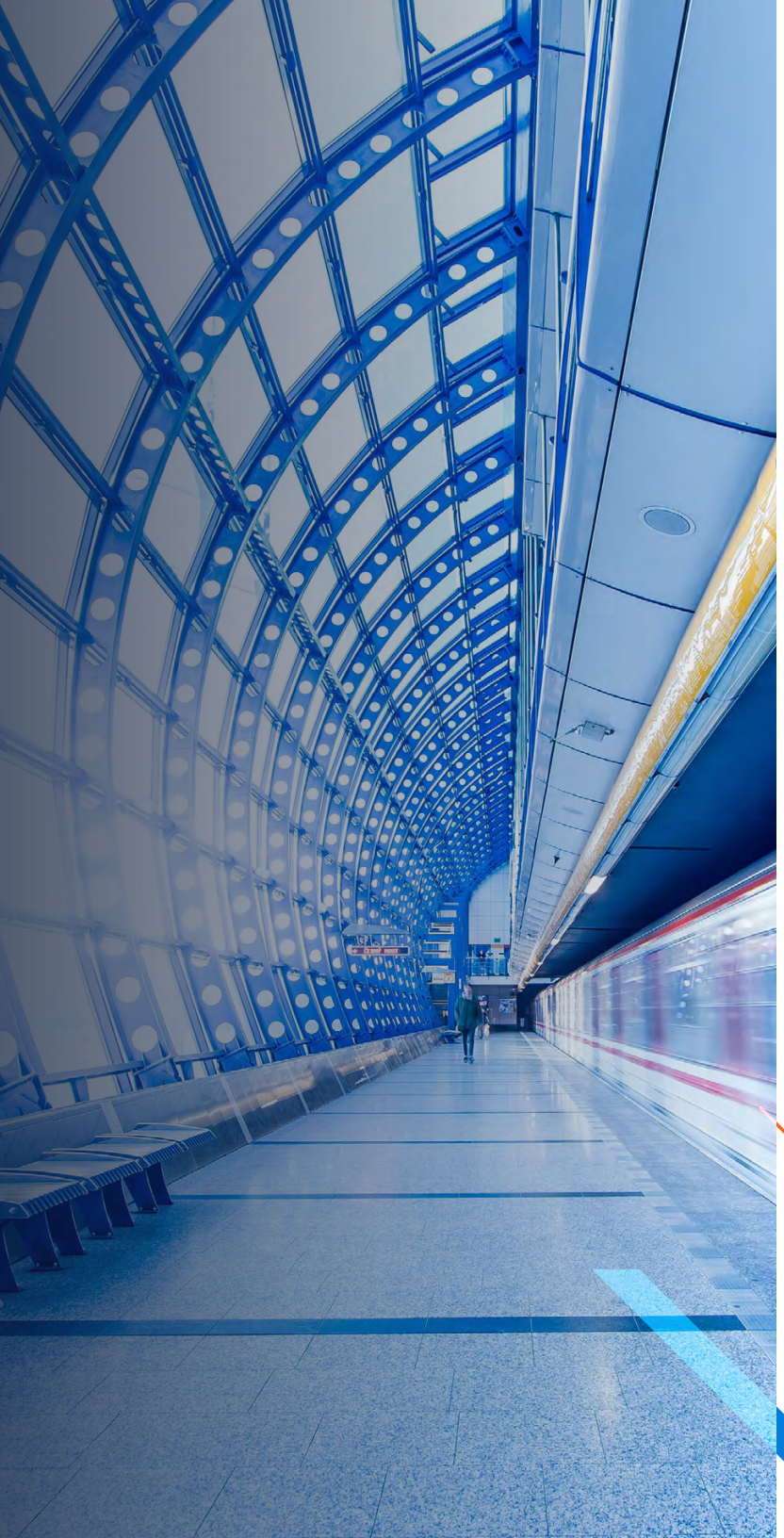

## Four main levers used to tune the performance of cloud-based storage:

1. **Increase the Compute, RAM, and Network speed of the Cloud NAS instance.**
AWS and Azure virtual machines come with a wide variety of computing configurations. The more compute resources you allocate to your Cloud NAS, the greater access you have to cache, Throughput, and IOPS.

2. **Utilize L1 and L2 cache.**
A Cloud NAS would automatically use half of system RAM as an L1 cache. You can configure the NAS to use NMVE or SSD disk per storage pool for additional cache performance.

3. **Use default client protocols.**
The default protocol for Linux is NFS, Windows default protocol is CIFS, and both operating systems can access storage through iSCSI. Although Windows can connect to storage with NFS, it is best to use default protocols, as Windows NFS is notoriously slow. With workloads such as SQL, iSCSI would be the preferred protocol for database storage.

4. **Have a dedicated channel from the client to the NAS.**
A cloud NAS improves performance by having dedicated storage attached to the NAS and a dedicated connection to the client, coupled with dedicated cache and CPU to move data fast.



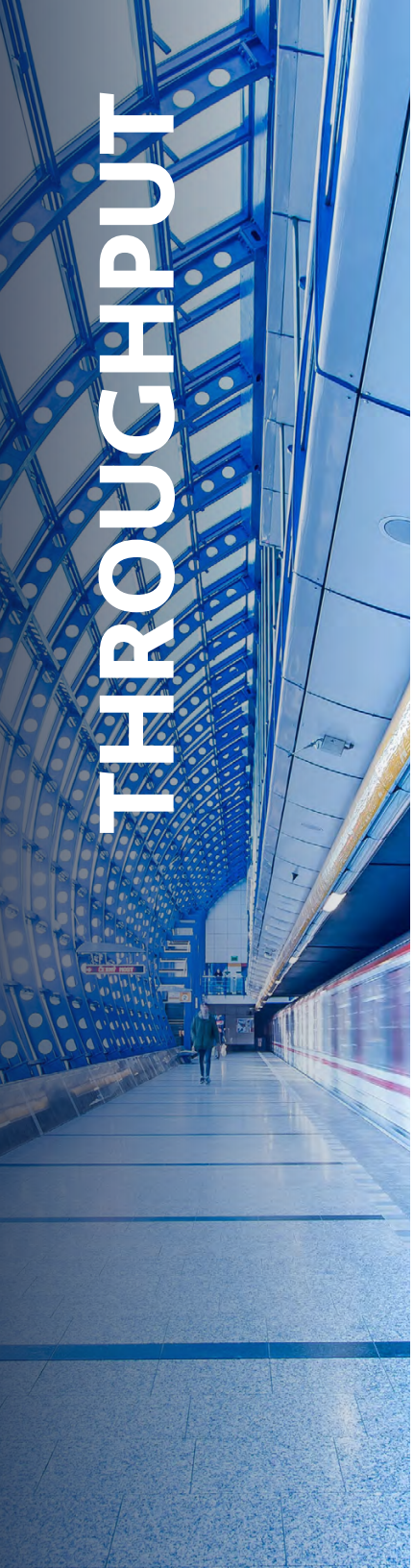
# Throughput

You may have seen Throughput numbers before when looking at cloud-based hard drive (HDD) or solid-state disk (SSD) specifications. Cloud storage offers many types of hard drives as a service that have different throughput specifications

Throughput is the measurement of

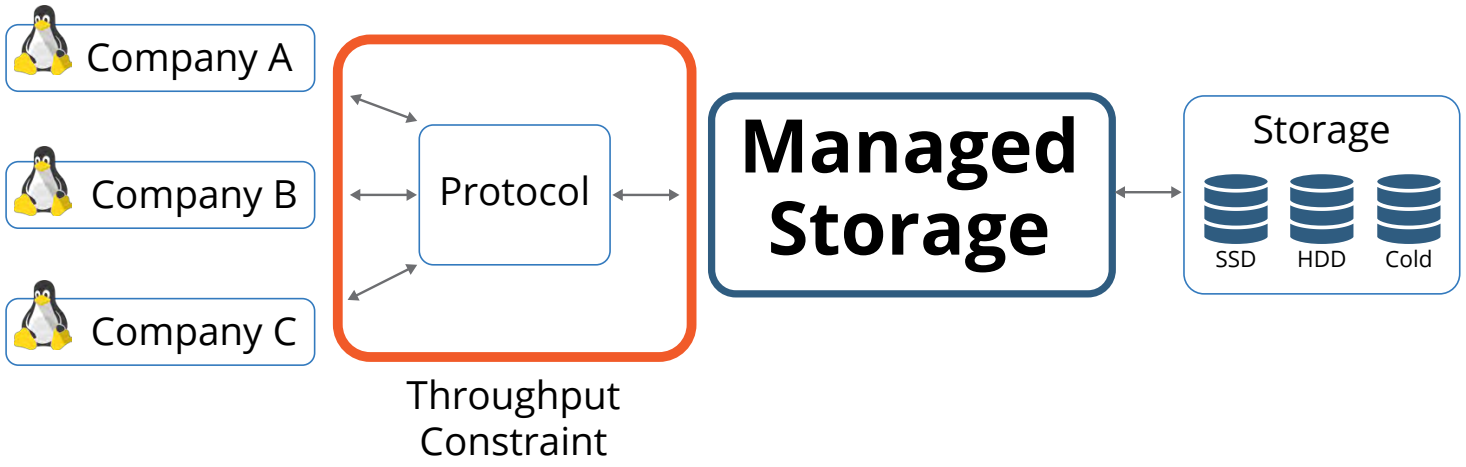
**how fast (per second) your storage can read/ write data,**

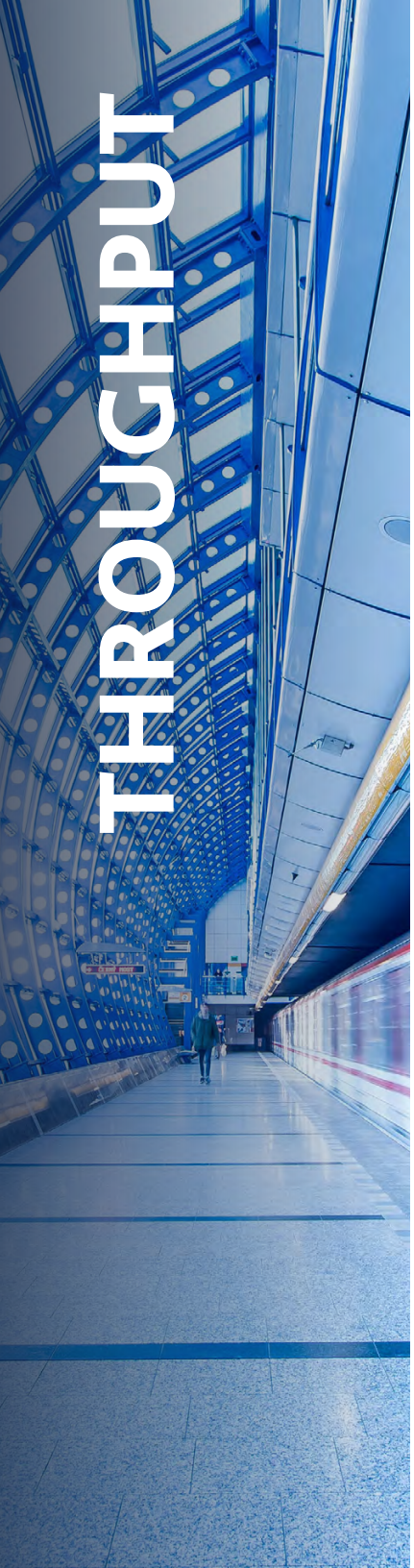
typically measured in MB/sec or GB/sec.




## Improve Throughput for Managed Service

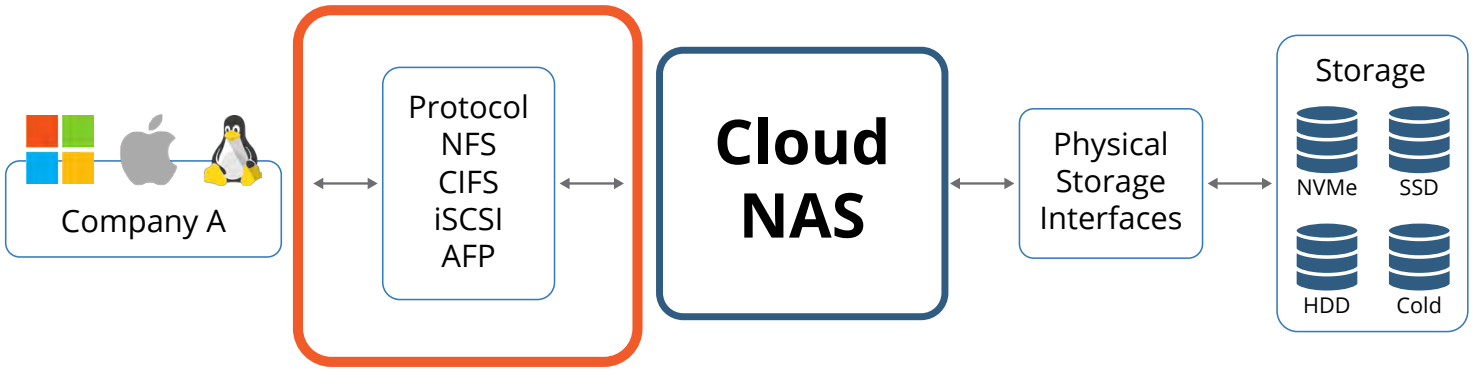
For managed cloud file services, Throughput is based on the amount of storage you purchase. To prevent one customer from overusing the access to a pool of disks, Azure and AWS throttle access to storage. They both also allow for short bursting to the disk set and will charge for over bursting.

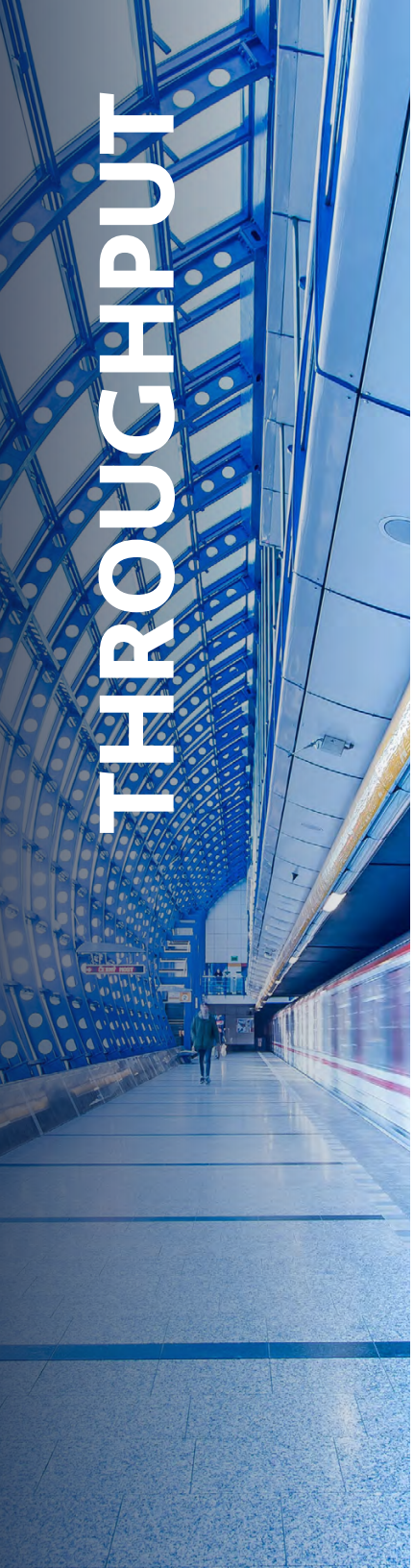





## Improve Throughput for Cloud NAS

For a cloud NAS, Throughput is determined by the size of the NAS virtual machine, the network, and disk speeds. AWS and Azure allocate more Throughput on VM images that have access to more RAM and CPU. Since the NAS is dedicated to the owner of the NAS, the storage is directly attached to the NAS; there is no need to throttle or burst limit throughput to the clients.

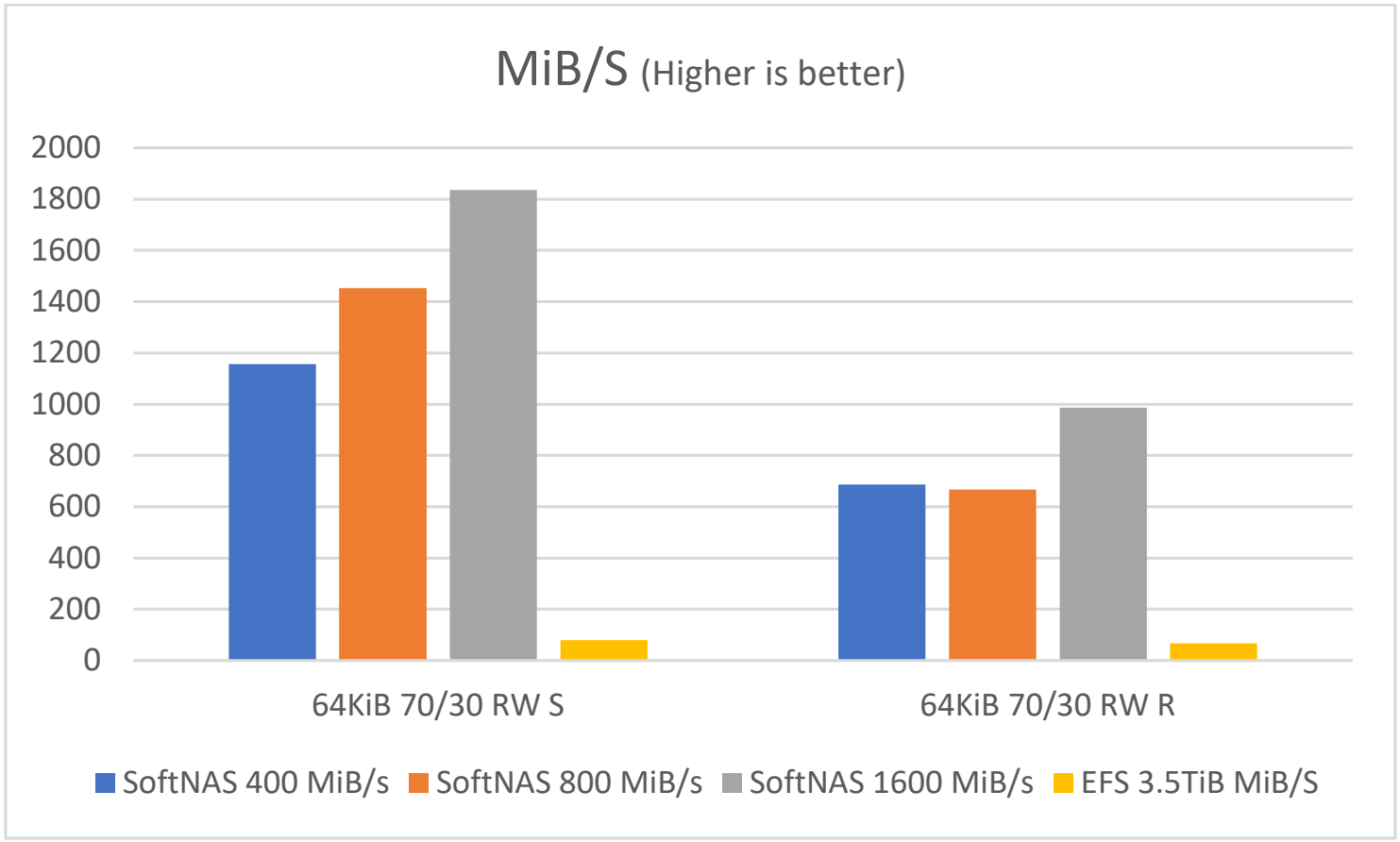





## Comparing throughput MiB/s

A Linux FIO server was used to perform a throughput evaluation of SoftNAS vs. EFS. With a cloud storage capacity of 768 GiB and a test configuration of 64KiB file size, 70% read and 30% write, the SoftNAS was able to outperform AWS EFS MiB/s in both sequential (S), and random (R) read/writes.

**For performance details, see the performance blog on Buurst.com.**



# IOPS

IOPs are Input/output operations per second, and this factor is used as a performance measurement to characterize storage performance. Disks such as NVMe, SSD, HDD, and cold storage vary in IOPS.

## Improve IOPS for managed cloud file storage

There is no configuration to increase the IOPS of a managed cloud file store.

## Improve IOPS for Cloud NAS

To improve IOPS on a Cloud NAS, you increase the amount of CPU's which increase the available RAM and network speed.

The higher the IOPS,
the faster you have access
to the data stored
on the disk.


## Comparing throughput IOPS

A Linux FIO server was used to perform an IOPS evaluation of SoftNAS vs. EFS. With a cloud storage capacity of 768 GiB and a test configuration of 64KiB, 70% read and 30% write, the SoftNAS was able to outperform AWS EFS in both sequential and random read/writes IOPS.

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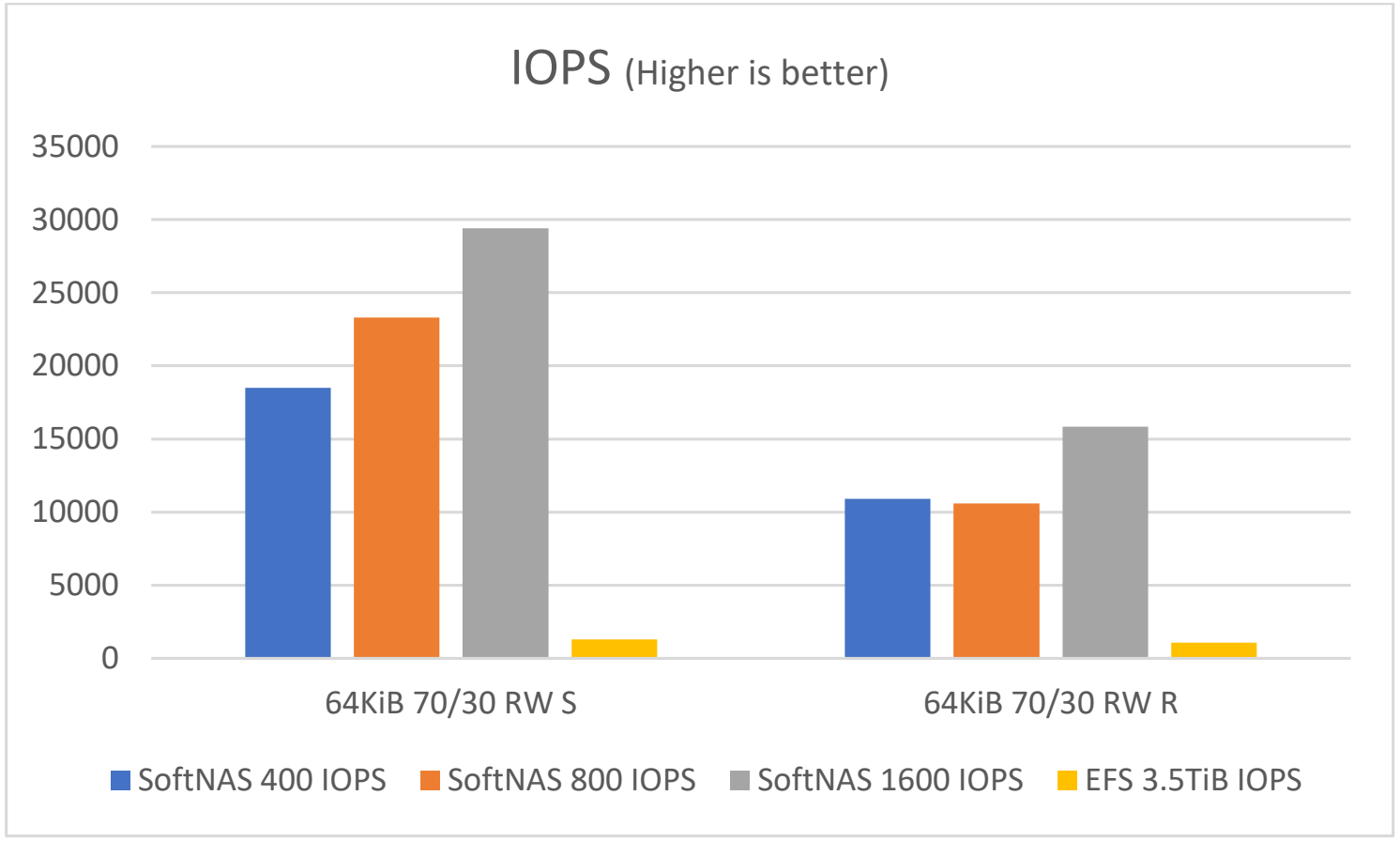

# Latency

Latency measures the time it takes for a component in a sub-system to process a data request or transaction. In a storage sub-system, Latency refers to the duration of a process from the point of receiving a data request, to finding the specific data, to accessing the data from the storage media.

Read Latency in a disk drive is the time spent for the controller to locate the proper data blocks and begin the transfer process by placing the heads over the blocks, including the time required to spin the disk platters.

## Improve Latency for managed cloud file storage

There is no configuration to increase the IOPS of a managed cloud file store.

## Improve Latency for cloud NAS

Latency improves as the network, cache, and CPU increases for the Cloud NAS.


## Comparing Latency

A Linux FIO server was used to perform a latency evaluation of SoftNAS vs. EFS. With a cloud storage capacity of 768 GiB and a test configuration of 64KiB, 70% read and 30% write, SoftNAS was able to outperform AWS EFS in both sequential and random read/writes for Latency.

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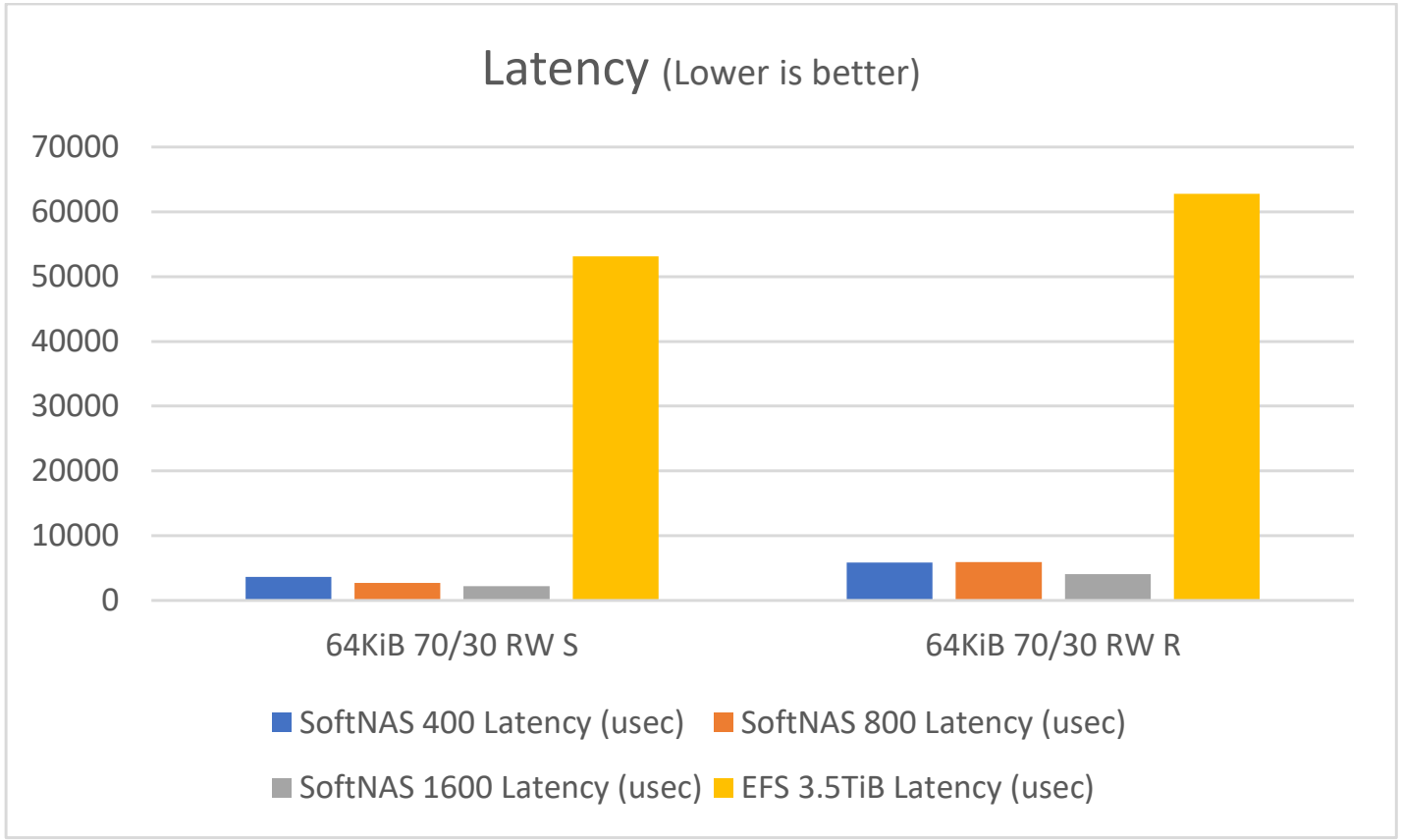


# Buurst:
# A data performance company

Buurst is disrupting traditional storage. At Buurst, we're thinking about your data differently, so you can continue to grow and move your business forward. You need to move fast, and so does your data. We're not selling a storage solution – we're providing enterprise Cloud NAS tools and resources your organization needs to keep up with the rapid pace of change, without charging you a Storage Tax on your data. Our nimble, cost-effective data migration and performance management solution opens new opportunities and capabilities that continually prepare you for success. Get all the tools you need so day one happens faster and be amazing on day two, month two, and even year two.

At Buurst, we make your cloud decisions work for you – and that means providing you data control, data performance, cost-management with storage tiering, and security.

# Modernizing your cloud storage with Buurst's SoftNAS

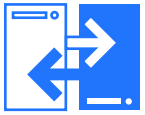
Buurst's SoftNAS is a Linux-based virtual appliance that can connect to the cloud of your choice, VMware, Amazon Web Services, or Microsoft Azure, designed to provide you with a broad range of NAS-like capabilities such as:

### Optimized performance

Configuration variables allow you to control performance levels and get the best experience for your data

### Data control and security

Enterprise NAS-like capabilities on the cloud for optimized data control and security



### Cross-zone high availability

Automatic cross-zone failover capabilities for a 99.999% uptime guarantee SLA

### Controlled cloud costs

Data deduplication, compression, and storage tiering drives down cloud storage costs by up to 80%

### Fast, seamless migration

Point and click file transfers for up to 200% faster migration speeds over high-latency and noisy networks

# How Buurst is eliminating the Storage Tax

## What does "Storage Tax" mean?

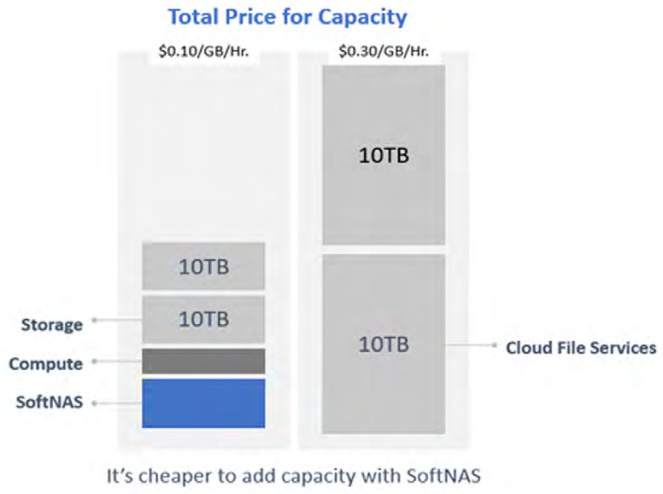
When you use a traditional storage vendor, they're always going add a Storage Tax:

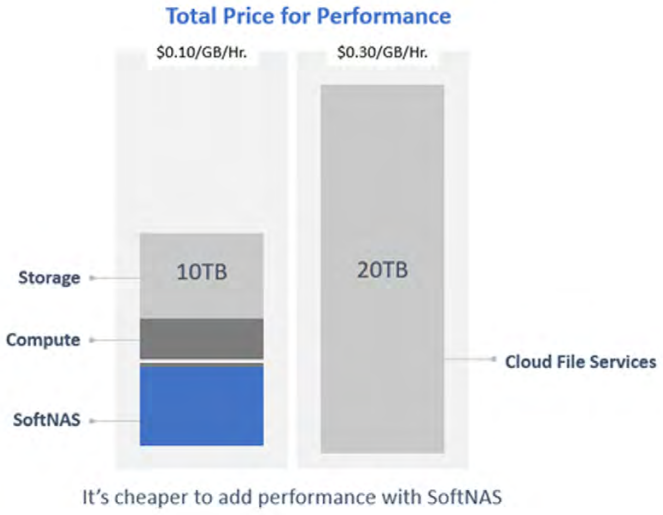
- **On your data** - charging you a second time for the storage you've already bought from your cloud vendor
- **On performance** – charging you for more storage, to get the performance you need
- **On capabilities** – charging you for premium storage to utilize NAS capabilities

## This is essentially a Storage Tax on your own data.

Buurst isn't selling storage. Instead, Buurst is selling data performance, availability, cost management, control, and migration. Buurst's disruptive pricing model charges a fixed fee, meaning the more data you have, the more cost-effective Buurst will be.

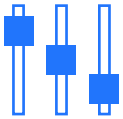
As illustrated in the diagrams to the right, adding performance and capacity with Buurst's SoftNAS is more cost-effective than cloud file systems. With a native storage solution, adding performance requires more storage. Whereas with Buurst, you can simply add the necessary performance to the SoftNAS node, helping you meet strict SLAs and performance requirements without sacrificing cost. Similarly, when you need more capacity, you can simply add more storage without needing to adjust the SoftNAS node or compute power.



# Getting started

## What if you could...



**Fine tune performance levels without being charged for your own data**

**Get high performance network connections while lowering the cost of your cloud storage**

With Buurst SoftNAS, you get data availability, control, cost-management, performance, and migration, without paying for storage.

## Try softNAS at no cost

aws

Deploy on AWS

Microsoft Azure

Deploy on Microsoft Azure

BURST

Get a performance assessment