ROI: Storage Performance Analytics

Determining the financial benefits of deploying WorkloadWisdom

WHITEPAPER

Introduction

WorkloadWisdom offers advanced workload modeling and storage infrastructure performance validations solutions. Our products provide critical insight to help our customers optimize the performance, reliability, and cost-effectiveness of their storage systems. WorkloadWisdom enables the accurate emulation of production application workloads at extreme scale to help you characterize storage system behavior and find storage system limits before being deployed in production. Virtual Instruments WorkloadWisdom saves organizations a significant amount of money and improves IT operational efficiency.

Given today's budget realities, all IT purchases must be clearly shown to result in a positive return on investment. The purpose of this document is to provide guidelines for estimating the Return on Investment for deploying WorkloadWisdom in a typical datacenter pre-production test environment. We have tried not to suggest broad, unsubstantiated, sweeping generalizations like "you'll pay for your solution in 6 months". Instead, we've suggested specific, concrete problems and solutions that you can relate to your own experiences. Not all examples herein will apply to every IT shop as needs vary across different organizations. The reader is encouraged to select the subset of problems and benefits that most closely applies to his/her data storage environment.

The primary economic benefits of WorkloadWisdom come from five areas: (1) operations efficiency, (2) storage cost optimization, (3) risk mitigation, which allows you to innovate faster, (4) improved application performance, and (5) faster problem resolution. We discuss the definitions and how to calculate the financial benefits of each of these below.

Operations Efficiency:
empowering a low-cost and highly efficient storage testing process

- Eliminate buying, provisioning and maintaining load generating servers and VMware licenses as one 2U appliance generates the load of 10-20 servers and hundreds of VMs,
- Save valuable people resources and time by implementing a consistent, standardized testing methodology. Easier, more comprehensive and repeatable testing often yields minimum productivity gains of 50%,
- Re-assign valuable storage engineering resources away from the cumbersome and time consuming testing tasks such as test development and scripting.
- Accelerate innovation by reducing project lengths and growing revenues by testing and validating 10X more projects per engineer/year,

Storage Cost Optimization

- Eliminate over or under-provisioning by aligning workload performance requirements to purchasing decisions,
- Determine which workloads require solid state storage, which ones to remain on HDDs, and which are best on hybrid storage systems, and
- Test the performance effects of a wide variety of cost-saving configuration changes such as protocols, tiers, data compression, network optimization, etc, – all without affecting your production users.

Risk Mitigation

- Avoid performance related outages by finding and fixing problems in pre-production,
- Know all performance limits and the impact of infrastructure changes like storage virtualization, firmware upgrades, and even application changes, before going live,
- Spend less time reacting to problems & more time on supporting growth initiatives,
- Attain the freedom to innovate with the latest storage technologies without the fear of unpredictable performance,
- Prevent production slowdowns and outages so that your business will increase revenues by avoiding lost sales from dissatisfied customers.

Improve Application Performance

- Use performance advantages to distance yourself from competitors.
- Realize the maximum benefits of deploying top tier applications on hybrid or all flash arrays.
- Provide business units with the most cost effective way to process more orders/day, handle more service calls, or make employees more efficient.

Speed Problem Resolution

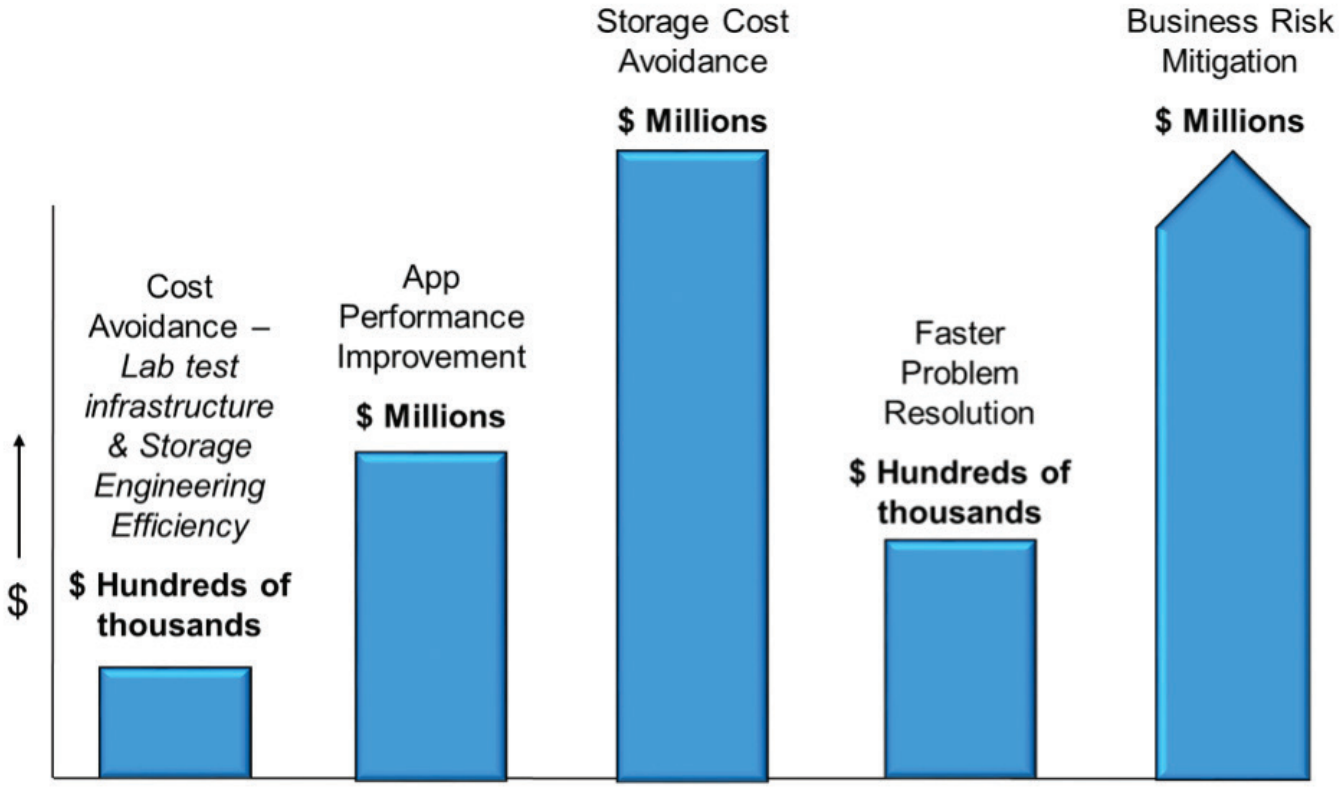
- Real-time understanding of application workloads to see changes and resolve incidents
- Identify hotspots and other performance characteristics
- Reproduce problems in your or your vendor's lab
- Validate fixes before committing changes to production

There are many different ways to financially justify IT infrastructure investments, including return on investment (ROI), payback period, internal rate of return, etc. In many cases, you may have to obtain funding for purchase from an executive committee and you will need comprehensive data to help substantiate your technology choices. The ROI concepts discussed in this white paper permit in-depth analysis of common scenarios to arrive at the expected ROI for a WorkloadWisdom purchase. With this guidance, and with the assistance of your Virtual Instruments Account Manager, you will have the data required to build the required business case.

We encourage you to examine this paper, and tell us what you think. Your comments may help improve the value of this analysis for others. Please contact us at: marketing@virtualinstruments.com.

Order of magnitude – 3 year financial benefits

The graph below is a quick way to visualize the relative magnitude of savings that can be realized over a 3-year period through the topics covered in this paper. Though savings can be found in all five places, it's the overall effect on reducing storage costs that our customers report to be the most compelling reasons for deploying WorkloadWisdom.



Financial Impact of Operations Efficiency

Improved engineer productivity

Before deploying modern test methodologies using WorkloadWisdom, our customers routinely report that their test architects and engineers spend nearly 80% of their time configuring the test environment and setting up tests and only 20% actually running tests. These numbers are reversed when using WorkloadWisdom. And after the tests are complete, there is the work needed to compile and analyze the output. With WorkloadWisdom, there's no need to assemble data from multiple sources; everything is available from a single pane of glass. WorkloadWisdom users save immensely from being able to do more actual tests per week and by using these newly freed up personnel resources for other projects. For this calculation, you'll need to know your burdened cost per storage engineer and the number of FTEs currently engaged in storage testing and QA. Our current customers often suggest a productivity improvement in excess of 50%. We suggest you use the following equation:

Calculation

	Annual loaded cost of a FTE storage engineer
x	Number of FTE storage engineers
x	% productivity improvement
=	Annual savings from productivity gain

Example Calculation

	$200K Annual loaded cost of a FTE storage engineer
x	**2** Number of FTE storage engineers
x	**50%** % productivity improvement
=	**$200K** Annual savings from productivity gain

Reduced test lab infrastructure costs

To emulate your production application workloads, you may have to drive an I/O profile that simulates hundreds or many thousands of clients. This may include a large CAPEX purchase and also involve significant provisioning tasks with hosts, VMs, and networking, including all the configuration, support, maintenance, and troubleshooting that goes with a large server farm.

Calculation

	Avoidance of yearly spend on load generating servers, VMs, networking, maintenance
+	Avoidance of admin cost for procuring, provisioning, maintaining lab (% of FTE x fully loaded average yearly labor cost)
=	Net annual savings of lab infrastructure costs

> ***"WorkloadWisdom is like Iometer on steroids! I can test 5 different storage arrays simultaneously, configure a base workload and test it, and then change the attributes and test again. I'm so much more efficient using WorkloadWisdom – I'll never go back to freeware tools again."***
>
> **Todd Gleason**
> MANAGER, FIREHOST

Example Calculation

$200K Avoidance of yearly spend on load generating servers, VMs, networking, maintenance

\+ **$100K** Avoidance of admin cost for procuring, provisioning, maintaining lab

(% of FTE x fully loaded average yearly labor cost)

= **$300K** Net annual savings of lab infrastructure costs

Total impact on Operations Efficiency

Calculation: Add sub-total from above:

Annual savings from productivity gain

\+ Annual savings of lab infrastructure costs

= Annual savings on Operations Efficiency

Example Calculation: Add sub-total from above sample calculations

$200K Annual savings from productivity gain

\+ **$300K** Annual savings of lab infrastructure costs

= **$500K** Annual savings on Operations Efficiency

Financial Impact of Application Performance Improvement

Improve value of storage infrastructure to business units by providing better performance

You can start by estimating the number of new, performance-sensitive applications you plan to deploy per year. Your gains will be due to optimal architecture / vendor / configuration decisions due to your new ability to have the real data on performance requirements. We suggest you use the following equation. Because the value of applications vary widely, it's difficult to estimate the dollar value of improved performance. But the areas you can mine for value include: more transactions per day, more service calls per day, and competitive advantage gained by providing a better customer experience (new customers or more business from existing customers). For instance, for a 5,000 per day transaction workload, can you provide 10% better performance, adding 10% more transactions per day for transactions valued at $1 per transaction? That would give you a daily / yearly value of $500 / $182,500.

Calculation

Number of applications deployed on new infrastructure

x Business value from performance improvement per application

= Annual savings benefit

> ***We can now assess the hottest storage technologies like SSDs, caching, tiering, and de-dupe, against our full production requirements, faster and more accurately than ever before. WorkloadWisdom puts us in the driver's seat when it comes to our storage roadmap and our cost structure.***
>
> **Justin Richardson**
> STORAGE ENGINEER,
> GO DADDY

Example Calculation

10 Number of applications deployed on new infrastructure

x **$182K** Business value from performance improvement per application

= **$1,820** Annual savings benefit

Financial Impact of Storage Cost Optimization

Find optimal cost storage solution based on workload performance requirements

You can start by estimating your planned annual spending on new storage infrastructure. Your efficiency gains will be due to optimal engineering (architecture / vendor / configuration) decisions due to your new ability to have the real data on performance requirements. We suggest you use the following equation. As a guideline, many customers conservatively estimate a 20% efficiency gain.

Calculation

Projected yearly spend on new storage infrastructure

x Efficiency gain % from optimal engineering decisions

= Annual savings benefit

Example Calculation

$10,000K Projected yearly spend on new storage infrastructure

x **20%** Efficiency gain % from optimal engineering decisions

= **$2M** Annual savings benefit

Financial Impact of Risk Mitigation/Faster Innovation

Impact of avoiding problems in production deployments

Larger companies and federal agencies are constantly rolling our new products and services with the goal of using the latest technologies available. Unfortunately, deploying new technologies and products before adequate testing can be completed is a highly risky endeavor. The conflict between trying to innovate quickly and minimizing the risk of performance problems is substantially alleviated when using WorkloadWisdom. With IT managers increasingly being charged with using Service Level Agreements to guarantee performance and availability levels, the impact of such problems can be dramatic. By reducing risk through comprehensive storage testing and validation, IT can contribute to the company's competitiveness by enabling faster innovation, or by reducing the risk of a catastrophic outage.

To determine the financial risks, you need to estimate the number of performance-related incidents per year related to scaling or new rollouts, and the average "cost to the business" of these incidents.

There are many studies concerning the cost of downtime, and they point out that most datacenter incidents are not caused by just storage performance problems, but they do exist.

> ***"Virtual Instruments made it easy to migrate to a private cloud. We were able to determine real-world behavior and save money. It doesn't get better than that!"***
>
> **System Operations Director**
> ELLIE MAE

In one study, dated 2013, Ponemon Institute reports costs per outage incident of between $390K and $970K, depending on industry. In our sample calculation below, we take a "middle" figure found in that study, and assume two per year.

Calculation

	Outage / incidents per year related to performance issues
x	Average business cost of each incident
=	Total yearly cost of not mitigating risk

Example Calculation

	2 Outage / incidents per year related to performance issues
x	**$680** Average business cost of each incident
=	**$1.36M** Total yearly cost of not mitigating risk

Financial Impact of Quicker Problem Resolution

Increase application availability by speeding problem resolution

Every minute and hour your systems are down or your application performance is severely degraded, your company loses money. The effects of non-availability, or degraded performance of systems can be huge and may result in loss of customers and highly frustrated users. Most companies can estimate the cost to the business of an hour of downtime for each business-critical application. Severe performance degradation has a similar effect as downtime, in that fewer transactions can take place in a given timeframe. For instance, if in a 10 hour period, performance is degraded by 10%, you can effectively do 10% less work. For ROI purposes, you can equate this to 10%, or 1 hour of "downtime", though your systems may never completely fail.

The deployment of WorkloadWisdom helps to increase the uptime of the storage infrastructure, one of the primary causes of application downtime. Today's legacy solutions for problem troubleshooting relies on making educated guesses and trying the fixes on production systems, often by swapping out suspected problem hardware or making configuration changes. This often results in either failure, masking the root cause, or even making the problem worse. By using WorkloadWisdom to profile your affected application workload, and replaying it in your, or your vendor's lab, you can more quickly isolate the problems and remediate them, without further risking your production systems.

Calculation

	Annual storage-related application unavailability, hours (see notes above)
x	Cost to the business unit, of unavailability (per hour)
=	Annual business impact of storage-related application unavailability
x	Percentage LDX-driven improvement (work with LDX consultant to estimate a figure)
=	Net annual benefit of LDX attributed savings in increased application availability

Example Calculation

	10 Annual storage-related application unavailability, hours (see notes above)
x	**$100** Cost to the business unit, of unavailability (per hour)
=	**$1000K** Annual business impact of storage-related application unavailability
x	**20%** Percentage LDX-driven improvement (work with LDX consultant to estimate a figure)
=	**$200K** Net annual benefit of LDX attributed savings in increased application availability

Summary

Note that in the Sample Calculations in the section above, the yearly cost of doing business your current way could be in the $ millions, using the this fictional example. Your numbers are sure to be different.

The cost of WorkloadWisdom is easily justified by a combination of any of the above benefits. After estimating your OPEX and CAPEX savings, your Virtual Instruments account team can provide a quote for our solutions. From this, you can generate an expected Return on Investment calculation.

One of our customers, the QA Director at Cisco, said it best: "After testing with WorkloadWisdom Enterprise, we found 30 bugs in 30 days — after our other testing tools found nothing. Getting a $1M ROI in one month is pretty cool."

We can't promise a one month ROI, but we look forward to working with you to add your actual projections into our full ROI model. Working together, we can develop a complete picture of the expected financial savings of deploying Virtual Instruments WorkloadWisdom.

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