



## Financial Benefits of Deploying VirtualWisdom®

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## 1. Introduction

Virtual Instruments' VirtualWisdom® collects, computes and tracks metrics from the Fibre Channel SAN and virtual infrastructure to provide both real-time monitoring and historical trend analysis of overall performance, availability, and utilization metrics. VirtualWisdom does this today by collecting data from three key sources:

1. Fibre Channel switches
2. VMware vCenter servers and
3. Headers of Fibre Channel frames

VirtualWisdom delivers when detailed knowledge of Virtual Server and SAN performance is essential, such as business-critical enterprise applications, business continuity planning, storage and server virtualization, and server consolidation projects. VirtualWisdom saves organizations a significant amount of money and improves IT operational efficiency.

Given today's budget realities, unless an IT purchase can be clearly shown to result in a positive return on investment, it will often be postponed in favor of those projects with ROIs that are more clearly defined.

The purpose of this document is to articulate the business value of VirtualWisdom and highlight common instances where Virtual Instruments' customers found OPEX or CAPEX savings due in part, to their VirtualWisdom product or services deployments. We have tried not to suggest broad, unsubstantiated, sweeping generalizations such as "you'll pay for your software in 6 months", or "you'll increase the TB under management by FTE by 25%". Instead, we've suggested specific, concrete problems and solutions that our customers can talk about. Of course, not all examples herein will apply to every business, as environments vary across different organizations.

The primary business benefits of VirtualWisdom come from three areas:

1. Efficiency of SAN operations
2. Reduced application downtime
3. Optimization of the virtual infrastructure including:
  - a. SAN links
  - b. Tiered storage
  - c. Virtualized servers

Each of these areas of business value is discussed in more detail in the sections below. In Sections 2 – 6 we offer more detail, including an overview on how we calculate the financial impact of the business benefit and explore some customer examples.

## Efficiency of SAN Operations

VirtualWisdom increases operational efficiency by reducing the number of SAN-related problems and providing the information needed to quickly identify and efficiently resolve problems when they do occur. Early problem identification and efficient troubleshooting capabilities VirtualWisdom provides will be vitally important to keeping low headcount in the face of ongoing SAN growth and complexity. Our customers frequently report both a large reduction in trouble tickets and a much faster time to problem resolution. Instead of taking days or weeks to resolve issues, VirtualWisdom can enable nearly instantaneous problem identification and reduce resolution times hours to minutes. This dramatic reduction in troubleshooting time increases productivity and improves operational efficiency, allowing administrators to focus on revenue-generating IT projects.

VirtualWisdom can identify problems before you go live with production applications, avoiding catastrophes and subsequently dissatisfied customers. VirtualWisdom can be a critical solution to assure the quality of newly deployed virtualized applications.

When applications are being measured and monitored, the business can be confident that it's running efficiently. When using the trending information provided by VirtualWisdom, administrators can identify and avoid performance and availability problems before they become real problems to the end users.

### Reduced Application Downtime

Every minute and hour systems are down, the company loses money and/or productivity. The effects of downtime of applications can be huge and may result in loss of customers. Most companies are able to estimate the cost to the business of an hour of downtime for each business-critical application.

The deployment of VirtualWisdom helps dramatically increase the uptime of the storage infrastructure, one of the primary causes of application downtime. Only VirtualWisdom can provide real-time root-cause analysis of problems in a SAN or virtual infrastructure. When implementing an instrumented and monitored infrastructure, system and storage administrators can immediately identify and quickly resolve application performance and availability problems. By reducing downtime, slow performance, or intermittent outages, the business will increase and protect revenue by avoiding these incidents.

### Infrastructure Optimization – Reduced SAN / Storage Links

VirtualWisdom helps increase SAN utilization by allowing SAN administrators to ensure that SAN workload is more evenly distributed across all of the available SAN capacity. Workload and storage traffic within most SANs today is unevenly distributed across the SAN infrastructure resulting in congestion in some areas while other areas are significantly underutilized. This often results in the unnecessary purchase of SAN ports and storage links.

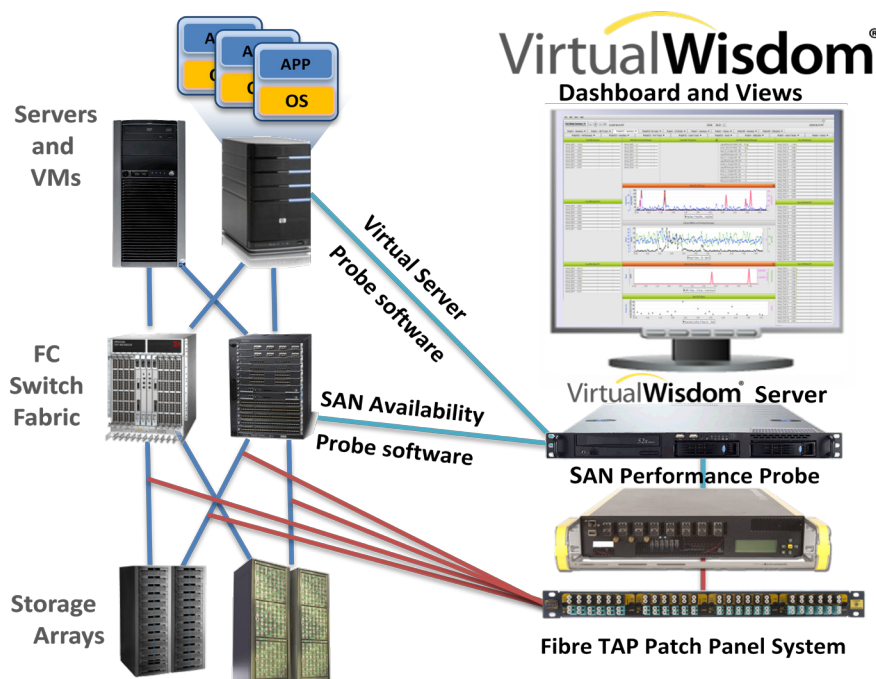
With VirtualWisdom, administrators have greater visibility into the SAN workload across the entire SAN infrastructure including virtual machines, LPARS, servers, HBAs, switches and storage arrays. There is visibility into which ports, servers and storage links are under or over-provisioned. This provides the ability to balance server and SAN resources for maximum application performance and optimum utilization.

### Infrastructure Optimization – Tiered Storage

In addition to enabling broad management of utilization, performance, and availability, VirtualWisdom's detailed views provide deep insight into real-time SAN performance and SLA compliance. Many of our customers have found that this level of objective, verifiable insight to application storage response time empowers them to deliver a more cost-effective tiered storage strategy. "Down-tiering" application storage is made less risky through the measurement, reporting and alerting of real-time response time metrics available with VirtualWisdom.

## Infrastructure Optimization – Virtualized Servers

The virtualization of servers is ubiquitous in data centers today, and the business benefits of this server deployment strategy are well-understood. However, many businesses have struggled to meet the financial goals projected by their server virtualization initiatives. The server virtualization objectives set by the business have not been met for a variety of reasons including reluctance by the business to virtualize certain applications due to concerns regarding performance and availability. In addition, the number of virtualized applications hosted on a physical server is often limited by performance concerns, particularly storage performance. VirtualWisdom gives system and storage administrators the ability to ensure storage performance meets the needs of the business by facilitating the use of storage performance SLAs. This allows more applications to be virtualized and ensures the capacity of the physical server is used to maximum potential resulting in reduced operating and capital costs.



### Illustration of a VirtualWisdom Deployment in a Heterogeneous SAN

Note: The customer examples in this document are anonymous. Most global enterprises are not eager to share their IT challenges publicly, but if you find an example that you would like to learn more about, your Virtual Instruments representative can accommodate you with a personal introduction to the customers we anonymously highlight in this whitepaper. The individuals at these businesses are your peers and very often open to sharing what they've learned with others in their profession.

## 2. The Financial Impact of Reduced Downtime

### 2.0 The Impact of Downtime on Cost

Many organizations are able to estimate the cost to the business when applications are unavailable or significantly impacted by degraded application performance. The impact to the business is a function of which application is impacted as well as the kind of “outage” (e.g. complete loss of functionality, reduced performance, intermittent failure). Some applications directly impact the businesses ability to collect revenue and some organizations also consider the long-term impact that may arise due to the less-than-satisfactory experience the customer may have during the application downtime. Other outages, while not directly impacting revenue or the customer experience, impact the productivity of the businesses employees and consequently have a “soft cost” impact to the business. Some businesses include these soft costs when quantifying the business impact of application outages while others choose to ignore them since there is not a direct impact to expenses.

### 2.1 Calculating Business Impact of Downtime

*Sample calculation:*

#### **For Revenue Generating Applications:**

$$\begin{aligned} & \text{Number of failure incidents per year} \\ \times & \text{Average incident duration in hours} \\ \times & \text{Cost to the business per hour} \\ = & \text{Annual business impact of downtime} \end{aligned}$$

#### **For Internal Business Applications:**

$$\begin{aligned} & \text{Number of failure incidents per year} \\ \times & \text{Average incident duration in hours} \\ \times & \text{Business impact per hour} \\ = & \text{Annual business impact of downtime} \end{aligned}$$

### 2.2 VirtualWisdom Benefits – Reduced Downtime

Each business has its own costs for staff and business impact. It doesn't take long to discover that anything that can be done to increase application availability can save businesses large sums of money, year after year. Of course, a system that is always available will give your customers confidence in your company, which is paramount in many vertical industries such as retail, telecommunication, finance, healthcare and e-commerce. VirtualWisdom helps improve the availability of the IT infrastructure and save large sums of money by alerting users proactively to potential storage outages, as well as system and network failures, helping to eliminate or substantially mitigate those problems.

*Sample calculation:*

$$\begin{aligned} & \text{Annual business impact of revenue generating application downtime (from above)} \\ + & \text{Annual business impact of internal business application downtime (from above)} \\ = & \text{Total annual costs of downtime} \\ \times & \text{VirtualWisdom-driven percentage reduction (e.g. 20\%)} \\ = & \text{Net annual benefit of VirtualWisdom attributed to reduced downtime} \end{aligned}$$

### 2.3 Customer example – Reduced Downtime

Here, we will point to one of the world's great consumer goods companies with over 150,000 employees in 100 countries supporting 300+ brands spanning over 10 categories of home, personal care and foods products. This company has a 12 petabyte SAN growing at almost 50% annually connected to over 3,000 servers, and 12,000 SAN ports, supported by 8 full-time-equivalent (FTE) engineers. The SAN uses IBM's SVC on the UNIX servers, which allows them to standardize the storage path and present a unified storage stream. The most mission-critical applications use IBM DS8000s for Tier 1 storage, with SVCs for virtualization, driven by IBM pSeries servers running AIX and VIO. Other storage is supplied by HP, with both XP and EVA systems.

#### Business Impact of Downtime

Ensuring the storage infrastructure is up and running 24x7x365 is essential for this business. VirtualWisdom helps the IT staff identify issues before they escalate into a potential application outage. This company estimates a 24 hour outage on their critical applications could cost in the region of \$70M, or \$48K/minute. In 2009 this company turned to Virtual Instruments' VirtualWisdom to provide their IT organization with an unparalleled view of the current system status as well as the ability to accurately pin-point problem areas before they resulted in frustrated users or costly downtime. Since the VirtualWisdom deployment in 2009, it reports less than one "urgent" event per year.

## 3. The Financial Impact of Improved SAN Operational Efficiency

### 3.0 The Impact of Operational Efficiency on Cost

SAN administrators along with system administrators, database administrators and other personnel within the business spend a significant amount of time addressing SAN problems (or perceived SAN problems). This is due to the sheer number of problems that occur and the difficulty and complexity in troubleshooting, identifying root cause and ultimately resolving these problems. Part of this operational burden is reflected in the number of problem tickets logged and the resources and lead time required solving them. However, for most businesses, the total SAN operational workload is not completely reflected by problem ticket statistics. Rather, there is a significant amount of operational work that takes place more informally, outside of the problem management system.

Operating in a primarily reactive operational mode and lacking the tools necessary to quickly identify and troubleshoot problems results in a labor-intensive SAN operational environment. This ultimately drives up the total cost of ownership of the SAN since more personnel are required to support the infrastructure.

Computing the operational cost of the SAN requires looking at the number of personnel required to support the SAN infrastructure. This assessment of personnel cost must also include the hours spent by non-SAN personnel (e.g. system administrators, DBAs, management personnel, application owners).

### 3.1 Calculating SAN Operational Costs

*Sample calculation:*

(Total weekly hours spent by SAN administrators  
x Burdened hourly rate for SAN administrators)  
+ (Total weekly hours spent by “other” personnel  
x Burdened hourly rate for “other” personnel)  
= Total Weekly SAN Operational Cost  
x 52 weeks  
= Total Annual SAN Operational Cost

### 3.2 VirtualWisdom Benefits – Improved SAN Operational Efficiency

Early problem identification and efficient troubleshooting capabilities that VirtualWisdom provides can be vitally important to keeping headcount low in the face of ongoing SAN growth and complexity. Our customers frequently report a large reduction in trouble tickets, much faster time to resolution and reduced effort to resolve problems from their use of VirtualWisdom. Many IT organizations track how long it takes to identify and resolve trouble tickets and the people resources involved. Unless a solution like VirtualWisdom is deployed, the isolation and identification of problems is the larger issue. With VirtualWisdom, our customers report the inverse; more time is spent on post-identification remediation. The ability to identify and locate errors immediately drastically cuts troubleshooting time.

*Sample calculation:*

Annual SAN Operational cost (from above calculation)  
x VirtualWisdom-driven percentage efficiency improvement (e.g. 20%)  
= **Net annual financial benefit of VirtualWisdom attributed improved operational efficiency**

### 3.3 Two customer examples – Reduced Trouble Tickets

#### Customer 1: Reduced Administrative Overhead due to Reduced Trouble Tickets

Because this is so closely related to reducing downtime, we again use our example of one of the world’s great consumer goods companies, with a 12 petabyte SAN growing at almost 50% annually connected to over 3,000 servers, and 12,000 SAN ports, supported by 8 full-time-equivalents (FTEs). Within 3 months of deploying VirtualWisdom, this organization’s trouble tickets dropped by 75%. And today, with nearly double the storage, the number of tickets has not increased.

When compared to other large organizations, this IT organization manages its storage with an average one-half of the staff. Today, it manages 12 PB of storage with 8 FTEs. If you assume a fully burdened cost of an admin to be \$150K/year, then this organization is recognizing an OPEX saving of about \$1.2M (8 FTEs x \$150K/FTE).

#### Customer 2: Reduced Administrative Overhead due to Reduced Trouble Tickets

This financial management and advisory firm is one of the largest in the world, with more than \$2 trillion in client assets. It’s a leading provider of global corporate and investment banking services, including commercial lending, global high-yield debt, global equity, and global M&A. Customer service and responsiveness are hallmarks of the firm, which means their IT infrastructure must be one of the most reliable in the world. The IT department is tasked with maintaining extremely high service levels in the face of high storage growth and flat headcount. This customer reports that “VirtualWisdom saves us 100 hours/week by helping us be proactive instead of waiting for an application owner to contact us.” At a fully burdened cost/year of \$150K, that’s a yearly savings of approximately \$375K.

## 4. The Financial Impact of SAN Links Optimization

### 4.0 The Impact of Underutilized SAN Infrastructure on Cost

Storage infrastructure is the fastest growing capital cost component within the typical Global 2000 data center. Gartner research shows that storage is increasing on average by about 30 percent per year. Research also shows that only about 20 to 30 percent of the storage infrastructure is effectively used, which means over-provisioning is extensive. With VirtualWisdom, administrators can easily uncover the under-utilized SAN links in their environment and reallocate those SAN resources to other applications, thus deferring spending by eliminating unnecessary SAN link expansion. The savings calculation is pretty simple:

#### 4.1 Calculating the Cost of SAN Links

*Sample calculation:*

Annual forecast for storage links added or refreshed  
X Cost per link (switch port, storage port, cabling and associated maintenance)  
= Annual forecasted cost of new/refreshed storage links

#### 4.2 VirtualWisdom Benefits – SAN Links Optimization

In addition to increased availability and streamlined management, which have a dramatic impact on a company's bottom line, a significant cost justification for VirtualWisdom comes from enhanced SAN asset utilization. With detailed, real-time metrics of both utilization and performance, customers are able to safely increase the utilization of their existing SAN infrastructure, accommodating increased storage workloads without negatively impacting either performance or reliability. We typically find storage port utilization can be increased by 50% or more.

The industry average "all in" cost of a storage port, comprising a storage port, core switch port, and attendant cabling is currently in the neighborhood of \$4,000 per port, for a fairly substantial potential CAPEX saving.

*Sample calculation:*

Annual forecasted cost of new/refreshed storage links (from above)  
x VirtualWisdom-driven percentage reduction (e.g. 20%)  
= **Net annual benefit of VirtualWisdom attributed to reduction in SAN / storage links**

#### 4.3 Customer example – SAN Links Optimization

This company, with revenues growing 33% year over year, is one of the leading e-commerce businesses, allowing payments and money transfers to be made securely through the internet. The payment service is as an electronic alternative to traditional paper methods such as checks and money orders and operates in over 100 markets with millions of accounts. The HDS storage environment in their U.S. datacenters includes USP-V for Tier 1 storage and AMS for Tier 2, running through a Brocade Fiber Channel SAN totaling 2400 ports and over 400 SAN connected hosts (Solaris and AIX). Primary applications are deployed on very large Oracle databases, with over 7 petabytes of storage and roughly 50% yearly growth.

According to the Operations Manager, Network and Storage Engineering, "With VI, we were able to track link utilization and it enabled us to save a boatload of dough by reducing the number of storage front-end ports. We went from 128 ports to 64, and then to 32 per new frame." At a cost per port of \$4K, that's a CAPEX savings of \$384K for every storage frame this customer deploys.

## 5. The Financial Impact of Tiered Storage Optimization

### 5.0 The Impact of Inefficient Storage Tiering on Cost

For companies whose volumes of data are growing, adequate storage and retrieval of that data is becoming a serious concern. In years past, IT would simply "buy more storage", which meant adding the fastest (and most costly) storage capacity to existing storage arrays or adding new storage arrays.

Most companies are rethinking their approach to data storage. High-end, "Tier 1" storage is very expensive, and using the highest performance storage for all data storage requirements is no longer a cost-efficient solution. In addition, most companies are now required to meet regulatory and legal requirements, so they must account for what data they have, where it is located and who is accessing it. These things cannot be determined by just adding disks. Tiered storage is an established means to address these changes.

Implementing a cost-effective tiered storage strategy has been hampered by reluctance to "down tier" data storage from both the business/data owners as well as the storage architecture team. This reluctance is generally driven by concerns regarding the performance of non-Tier 1 storage technology. However, the reality is that performance requirements for many applications can be comfortably met by Tier 2 (Tier 3 in some cases) storage technology. What is needed is a way to establish the performance requirements (via measurement and then defined SLAs) and then the ability to continuously measure and monitor storage performance in order to ensure that those requirements are being met. VirtualWisdom provides exactly this capability.

To determine the financial benefits you need to know the total costs of each tier of storage, including the cost of providing the SLAs you sign up for. It's not just the difference between SATA and FC disks, or SSDs. You'll need to factor in controllers, services to get up and running, maintenance, power, and perhaps most significantly, the very different software costs associated with various storage tiers. Software on traditional Tier 1 arrays can easily exceed Tier 2 software costs by three to six. In addition to the simple calculation shown below, savings calculations may also include significant floor space and environmental costs (cooling, power, etc.).

### 5.1 Calculating Costs of Tier 1 and Tier 2 Cost Differential

*Sample calculation:*

Hardware costs of Tier 1 storage, per TB	
+ Software costs of Tier 1 storage, per TB (or apportioned from other licensing types)	
+ Hardware and Software maintenance costs of Tier 1 storage, apportioned per TB	
+ <u>Professional services costs of Tier 1 storage, apportioned per TB</u>	
= Total Tier 1 cost per TB	
Hardware costs of Tier 2 storage, per TB	
+ Software costs of Tier 2 storage, per TB (or apportioned from other licensing models)	
+ Hardware and Software maintenance costs of Tier 2 storage, per TB	
+ <u>Professional services costs of Tier 2 storage, apportioned per TB</u>	
= Total Tier 2 costs per TB	
Total Tier 1 cost per TB (from above)	
- Total Tier 2 costs per TB (from above)	
= Per TB difference between Tier 1 and Tier 2 storage	

## 5.2 VirtualWisdom Benefits – Tiered Storage Optimization

Many IT teams rely on vendor “best practices” and “rules of thumb” when establishing rules for their tiered storage environment because they lack good performance metrics and instrumentation of the Fibre Channel storage environment. For instance some install Oracle databases served by UNIX/LINUX hosts on Tier 1 while all Windows applications are served by Tier 2 storage. This is done rather arbitrarily, without regard to the real performance requirements of the application.

VirtualWisdom’s detailed views provide deep insight into real-time I/O performance and SLA compliance. Several VirtualWisdom customers have found this level of objective, verifiable insight empowers them to deliver Tier 1 SLAs with less-costly Tier 2 storage devices. The cost benefits here can be very compelling, as the price difference between Tier 1 and Tier 2 storage can be significant.

*Sample calculation:*

$$\begin{aligned} & \text{Expected Tier 1 TB growth + expected Tier 1 TB refresh in the next year} \\ \times & \text{ Expected percentage of Tier 1 that can be accommodated on Tier 2, using VirtualWisdom} \\ = & \text{ TB of storage that can be accommodated on Tier 2, instead of Tier 1, over the next year} \\ \\ \times & \text{ Cost differential of Tier 1 and Tier 2 storage, per TB (from above)} \\ = & \text{ **Potential cost savings when VirtualWisdom is used to ensure that performance of Tier 2 Storage meets SLAs**} \end{aligned}$$

## 5.3 Customer example – Tiered Storage Optimization

This Virtual Instruments customer is a leader in the grocery retailing industry – one of the top 3 in the U.S. This grocer combines expertise in retail and supply chain operations - two highly complementary core competencies. To support the extensive supply chain infrastructure, the Information Technology team must provide extremely high levels of application availability for payroll, pharmacy, financials and merchandising, amongst others. With data growth exceeding 20% per year and pressure to maintain profitability in a hyper-competitive market, the data storage team is expected to help contribute to the financial success of the company. Like most businesses, this grocer is challenged with tight budgets and with getting more and more performance from existing infrastructure capacity.

According to the IT staff, “We always use VirtualWisdom for performance testing. We use it to determine performance characteristics on EMC DMX and CLARiiON when deciding between Tier 1 and Tier 2 storage. In fact, we wouldn’t have nearly as much Tier 2 storage without VirtualWisdom because it enables us to monitor response times for our critical applications and proactively respond if we detect any degradation. It allows us to deploy more Tier 2 storage and still meet the requirements of the business.”

Although this team has not assigned a dollar value to the savings, with over 2 petabytes of online storage and the mandate to help the company maintain profit margins, the contribution to the company’s bottom line is substantial.

## 6. The Financial Impact of Server Virtualization Optimization

### 6.0 The Impact of Inefficient Server Virtualization Optimization on Cost

Most businesses have deployed some, or many types of server virtualization within their data centers with the goal of reducing “server sprawl” and driving down both operating and capital expenses of their computing environment. The cost benefits of server virtualization are very real and well-understood by most businesses. These benefits are derived from having to deploy fewer physical assets (servers in this case) while making more efficient use of the capacity of those assets (i.e. driving higher levels of server utilization).

All IT organizations recognize that having to procure, install, operate and support fewer physical servers results in cost savings, both from an operating as well as capital expense perspective. Most businesses have established aggressive goals for running applications on virtualized servers. For example, one business that we have talked to set a goal of running 90% of their applications on virtualized servers.

However, many businesses have not been able to achieve their stated server virtualization and financial benefits goals for two key reasons. First, they have not been able to virtualize all the applications they had targeted. Second, they have had to deploy more physical servers than they planned on. In the first case, server virtualization adoption has lagged behind stated goals because either the business units have been reluctant to virtualize their specific applications due to concerns about reliability or performance or IT has taken a very conservative approach when selecting applications for virtualization, again due to concerns about performance. In the second case, again due to performance concerns, fewer virtualized applications are running on a single physical machine which ultimately means that more physical servers are required to support the virtualized applications.

Therefore, computing the financial benefit of increasing server virtualization adoption and density is a matter of quantifying the difference in cost of deploying an application on a physical server versus on a virtualized server. This cost differential must then be applied across the estimated number of applications that would be migrated to a virtualized server and adding that cost savings to the change in server virtualization density that would be achieved (e.g. 30 applications per physical server instead of 25 applications).

### 6.1 Calculating the Difference in Physical versus Virtual Application Deployment

#### *Sample Calculation*

**For a physical application server:**

#### **CapEx Costs**

Physical server hardware procurement cost  
+ Physical server software procurement cost  
+ Server facility costs (cabling, floor space)  
+ Personnel installation and configuration cost  
= Total Physical Server CapEx Cost

#### **OpEx Annual Costs**

Physical server environmental costs (power, cooling)  
+ Hardware and software maintenance  
+ Server personnel support cost (hours x burdened rate)  
= Total Physical Server OpEx Cost per year

**For a virtual application server:**

**CapEx Costs**

- Apportioned component of physical server hardware procurement cost
- + Apportioned component of physical server software procurement cost
- + Apportioned component of server facility costs (cabling, floor space)
- + Apportioned component of personnel installation and configuration cost
- = Total Virtual Server CapEx Cost

**OpEx Annual Costs**

- Apportioned component of physical server environmental costs (power, cooling)
- + Apportioned component of hardware and software maintenance
- + Apportioned component of server personnel support costs (hours x burdened rate)
- + Virtual server personnel support cost (hours x burdened rate)
- = Total Annual Virtual Server OpEx Cost

- Total Physical Server CapEx Cost
- Total Virtual Server CapEx Cost
- = **Physical versus Virtual CapEx Cost Differential**

- Total Physical Server OpEx Cost per year
- Total Virtual Server OpEx Cost per year
- = **Physical versus Virtual Annual OpEx Cost Differential**

6.2 VirtualWisdom Benefits – Server Virtualization Optimization

Increasing the number of applications that get virtualized (i.e. increasing the adoption rate) and increasing the number of applications running per physical machine (i.e. increasing server virtualization density) will lead to fewer physical machines which in-turn decreases both operating and capital costs of the server infrastructure. VirtualWisdom allows a business to proactively manage storage performance so that I/O performance does not artificially constrain either the adoption rate or density of virtual server deployments.

*Sample calculation:*

- (Number of existing applications on physical servers being refreshed per year
- + Number of net-new applications on physical servers being deployed per year)
- x Percentage of these applications that can be virtualized due to VirtualWisdom
- = Number of newly virtualized applications due to VirtualWisdom

- Number of newly virtualized applications due to VirtualWisdom
- x Physical versus Virtual CapEx Cost Differential (from above)
- = **Total CapEx Savings from server virtualization optimization**

- Number of newly virtualized applications due to VirtualWisdom
- x Physical versus Virtual OpEx Cost Differential (from above)
- = Total Annual OpEx Savings from server virtualization optimization

### 6.3 Two customer examples – Server Virtualization Optimization

#### Customer 1: Increased Adoption of Server Optimization

This large utility company in the Northeast US had an aggressive application server virtualization goal. Their goal was to run 90% of their applications on virtualized servers by 2015. However, they were stalled at about 40% virtualization due to concerns by both the IT organization and the business units regarding how application performance would be impacted by the consolidation of multiple applications on a physical server. Without the tools to track and monitor performance from the VM to the storage LUN, how would they be assured of meeting their application performance requirements? They had successfully migrated all of the “low hanging fruit” applications to virtual servers, which represented about 800 of their 2,100 total applications. This company immediately saw how VirtualWisdom could help them meet their server virtualization goal of 90% of applications. They estimated the cost difference between an application deployed on a virtual server versus a physical server was about \$5,000 in CapEx and \$500/year in OpEx. Over a three-year period they estimated CapEx savings of over \$4 million and OpEx savings of almost \$1 million by virtue of being able to virtual existing and net-new applications. While this company has obviously not yet achieved this level of application of virtualization, they clearly saw that they needed VirtualWisdom to provide them with the tools needed to ensure that storage performance did not constrain their server virtualization initiatives.


#### Customer 2: Reduced Physical Server Infrastructure Costs

This financial management and insurance company based in the Northeast US is a large IBM System p server user. They are in the process of upgrading their System p environment from POWER6-based servers to POWER7-based servers. Their current POWER6 deployment consists of approximately 80 LPARs per server and leverages the Virtual I/O Server (VIOS) capability by running two to four pairs of VIOS LPARs on each server to consolidate I/O workload. This upgrade provides significant improvements in CPU and memory speed and capabilities, which the business plans on leveraging by increasing the number of LPARs on each server, thereby reducing the overall number of servers required to support the business applications and reducing overall costs. However, the company and their System p business partner were concerned about storage performance because the POWER7 I/O subsystem is still essentially the same as the POWER6 version. Because each of these high-end servers, when fully configured, could cost over \$3 million, they wanted to ensure that they designed a cost-effective server infrastructure that efficiently leveraged the new CPU and memory capabilities while ensuring storage performance did not constrain overall performance. Virtual Instruments and VirtualWisdom were leveraged to assess the current storage workload and performance profile of the existing POWER6 environment. This data was then used in the design of the I/O architecture for the new POWER7 environment. At the time of writing this whitepaper the final design had not yet been completed but it is estimated that by better understanding the storage workload requirements the company will save between \$500 thousand and \$1 million in System p hardware and software in the initial rollout of the POWER7 servers.

## 7. Summary

Every company has its own challenges and business imperatives, but at the end of the day, all decisions must be justified by some return on investment. Candidly, it's a rarity to find anyone who does a completely exhaustive ROI analysis, and just as rare to find someone who closely examines the actual results of all investments on an ongoing basis. Still, we learn from what our customers tell us, and we hope by using actual customer experiences in this whitepaper, it helps to identify some real-world savings that might apply to your environment.

We encourage you to examine this whitepaper, and tell us what you think. Your comments will help to improve the value of our analysis. Please email us at: [marketing@virtualinstruments.com](mailto:marketing@virtualinstruments.com).

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