

Optimizing an IBM AIX VIO Server with LPARS in a Fibre Channel SAN with VirtualWisdom®

HIGHLIGHTS

VirtualWisdom increases the benefits of virtualized IBM AIX systems :

- Reduces the risk of virtualizing more mission critical applications
- Reduces the risk of deploying more LPARs per physical server
- Enables more aggressive use of tiered storage by improved tiered storage planning and ability to prove performance SLAs
- Operational (OpEx) savings through improved operations and faster troubleshooting
- Capital expenditure (CapEx) savings by eliminating switch over-provisioning and over-tiering
- Better adherence to, and monitoring of SLAs and external regulations



Introduction

Virtualization is a hot topic in the computing industry, with many widely different technologies and solutions being recommended, developed and used. IBM POWERx-based machines have inherited the know-how from IBM mainframes to provide opportunities for a significant reduction in operating costs for complex environments. The POWERx implementation uses advanced processor features, firmware (also known as Hypervisor) and hardware features to create efficient and flexible virtualization capabilities. These capabilities are offered from the top to the bottom of the server range. The key to this virtualization is the Virtual I/O (VIO) Server.

Virtual Instruments' VirtualWisdom supports and enhances the use of VIO and logical partitions (LPARs), by offering the industry's only real-time Fibre Channel SAN performance monitoring and optimization solution.

VIO / LPAR Architecture

pSeries servers from IBM allow a machine to be divided into LPARs, with each LPAR running a different OS image -- effectively a server within a server. This can be achieved by logically splitting a large machine into smaller units with CPU, memory, and PCI adapter slot allocations.

The pSeries and OpenPower servers can also run an LPAR with less than one whole CPU -- multiple LPARs per CPU. With each LPAR needing a minimum of one SCSI adapter for disk I/O and one Ethernet adapter for networking, 20 LPARs would require the server to have at least 40 PCI adapters. This is where the VIO Server helps.

IBM VIO Resource Sharing

The VIO Server owns real PCI adapters (Ethernet, SCSI, or SAN), but allows other LPARs to share them remotely using the built-in Hypervisor services. These other LPARs are called Virtual I/O client partitions (VIO client). And because they don't need real physical disks or real physical Ethernet adapters to run, they can be created quickly and cheaply. Each VIO client operates as if it had a dedicated SCSI device but in fact, each client device is a real disk partition (logical disk partition) on the VIO Server. The VIO Server and VIO client communicate using the pSeries Hypervisor, allowing disk I/O requests to be transferred between the LPARs using a message-passing protocol.

Virtual fibre environment and VirtualWisdom

For IBM AIX systems (AIX 5.3 TL9 or later, or AIX 6.1 TL2 or later) which support N_Port ID Virtualization (NPIV), SAN objects such as switches, HBAs, storage devices, or virtual machines can be assigned World Wide Name (WWN) identifiers. WWNs uniquely identify such objects in the Fibre Channel fabric and by using NPIV, a SAN administrator can monitor and route storage access on a per virtual machine (LPAR) basis. A detailed solution for mapping VIO port WWN's to proper manufacturer and device type can be obtained from your Virtual Instruments Solutions Consultant.

WWPNs do not move with the LPAR. Each virtual HBA path has an active and passive WWPN, one residing in each physical frame. For instance, LPAR1 on HBA1 will have WWPN X and WWPN Y. When the LPAR is active on Physical Frame A, WWPN X will be active and WWPN Y is disabled. If the LPAR is migrated onto Physical Frame B, then WWPN Y is activated and WWPN X is disabled. For this reason, VirtualWisdom does not need to handle WWPNs moving across switch ports.

NPIV is typically used in high throughput, high I/O environments where VirtualWisdom is often deployed to ensure optimized performance.

Virtual SCSI environment and VirtualWisdom

Without NPIV (also referred to as Virtual Fibre, above) enabled, VirtualWisdom does not differentiate by LPAR, but still can differentiate by LUN. This is also referred to as a Virtual SCSI environment.

VirtualWisdom's Value Add

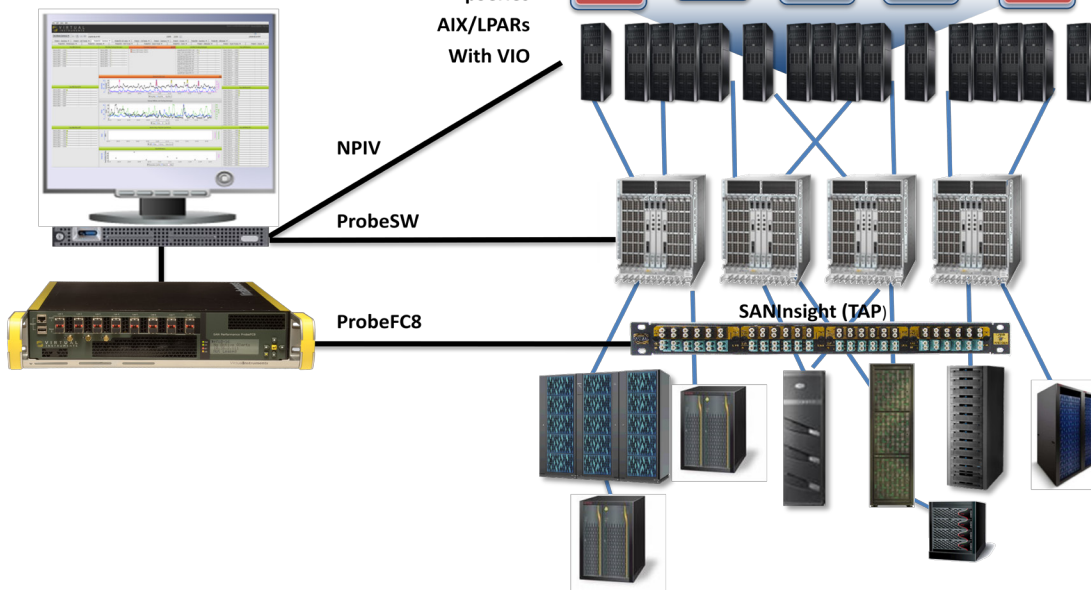
VirtualWisdom is an innovative solution that helps IT organizations realize the full economic benefits of networked storage and server virtualization, including environments running IBM's AIX with VIO and LPARs.

When used with NPIV or dedicated LUNs, VirtualWisdom and SANInsight SAN Performance Probe, can track individual I/Os from the LPAR through to the LUN. With this full path awareness, VirtualWisdom enables:

- Operational (OpEx) savings through improved operations and faster troubleshooting
- Capital expenditure (CapEx) savings by eliminating over-provisioning and over-tiering
- Better adherence to, and monitoring of SLAs and external regulations
- Higher revenues through accelerated application and SAN deployments
- Stronger vendor management and improved vendor relationships
- Increased use of server virtualization and LPARs per server
- Accelerated use of storage tiering
- Reduction in unplanned downtime

- Higher revenues through accelerated application and SAN deployments
- Stronger vendor management and improved vendor relationships
- Accelerated use of storage tiering
- Reduction in unplanned downtime

VirtualWisdom®



SAN Topology with pSeries and VirtualWisdom

VirtualWisdom provides comprehensive instrumentation and measurement capabilities of the SAN and virtualized infrastructure that reduce application response time, accelerate storage I/O, increase availability, and improve resource and SAN utilization. VirtualWisdom is the only solution that can non-intrusively improve the performance of virtualized applications in real-time by analyzing actual SAN I/O traffic data.

A more thorough discussion of VirtualWisdom benefits that apply to all FC SAN and virtualized environments can be found at www.virtualinstruments.com.

Summary

This information brief is meant to be an overview document and details on specific capabilities of different generation IBM pSeries systems and AIX releases should be obtained directly from IBM.

Virtual Instruments' VirtualWisdom supports the use of VIO Servers and with NPIV, offers full path monitoring from the LPAR to the LUN. VirtualWisdom increases the value of the virtualized AIX-based environment through more aggressive use of tiered storage, faster troubleshooting, eliminating switch over-provisioning, better monitoring of SLAs, and lowering the risk of deploying more LPARs per server and virtualizing mission critical applications.



Corporate Headquarters
 25 Metro Drive Suite 400
 San Jose, CA 95110
 Phone: 408-579-4000
 Fax: 408-579-4001

Sales
sales@virtualinstruments.com
 Phone: 408-579-4081

Support
support@virtualinstruments.com

©2011 Virtual Instruments. All rights reserved. Features and specifications are subject to change without notice. VirtualWisdom, Virtual Instruments, SANInsight are trademarks or registered trademarks in the United States and/or in other countries. All other brands, products, or service names are or may be trademarks or servicemarks of, and are used to identify, products or services of their respective owners. 09/11