



# **Server Virtualization Requirements and Configuration Guide for PowerSchool**

PowerSchool Student Information Systems

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## Introduction

Server virtualization within IT environments has become a popular concept to reduce costs and effectively utilize resources in IT infrastructure through server consolidation. VMware vSphere®, Microsoft Hyper-V, Citrix Hypervisor, and other server virtualization platforms can be successfully used to host virtual machines as virtualized PowerSchool SIS servers.

The purpose of this document is to provide PowerSchool customers with an understanding of the appropriate usage and valid configuration methods for utilizing server virtualization with PowerSchool SIS. Customers should be familiar with the PowerSchool environment components found in the *PowerSchool Hardware and Software Requirements*, available on [PowerSource](#).

For information on how to install and configure these server virtualization technologies, consult the server virtualization platform provider's documentation.

The following configuration scenarios are valid for utilizing server virtualization with PowerSchool SIS deployments:

- A single school district with enrollments fewer than 3,000 students can utilize server virtualization to deploy a single Microsoft Windows server solution with the Oracle database and PowerSchool Tomcat application node residing on the same virtual server.
- A single school district with enrollments of 3,000 to 7,000 students can utilize server virtualization to deploy a two server Microsoft Windows solution with the Oracle database and PowerSchool Tomcat application node residing on separate virtual servers. One virtual server supports the Oracle database; the other supports the PowerSchool Tomcat application node.
- A single school district with enrollments over 7,000 students can utilize server virtualization to deploy virtualized PowerSchool Tomcat application node(s), a virtualized PowerSchool database server, and a virtualized PowerSchool image server. In this scenario, one virtual server supports the Oracle database; the other virtual servers support the PowerSchool Tomcat application node(s).
- PowerSchool non-production test bed server deployments.

This document describes optimal configuration guidelines for implementing PowerSchool SIS within a server virtualization environment but does not provide step-by-step instructions on how to install or configure the server virtualization platform. The configuration guidelines listed herein are required to ensure system usability and a quality user experience. PowerSchool Technical Support does not provide any support for configuring or troubleshooting server virtualization environments.

PowerSchool does offer customers consulting services to design, integrate, and support various server virtualization solutions. Contact your PowerSchool account executive or email [TSGHelpDesk@powerschool.com](mailto:TSGHelpDesk@powerschool.com) for further details.

## Important Notes

- This document is intended for system administrators. To use this document, you must be familiar with server virtualization technologies, server hardware, storage, and networking configurations.

- This document is designed to assist customers with system configuration guidance for virtualized PowerSchool SIS environments.
- When provisioning server virtualization hardware to host virtual PowerSchool SIS server(s), ensure that the physical server has ample compute resources such as processors, memory, and storage available to support the virtual PowerSchool SIS server(s). Virtual PowerSchool SIS server(s) must meet the requirements referenced in the *PowerSchool Hardware and Software Requirements*, available on [PowerSource](#).
- PowerSchool SIS servers have been successfully virtualized with VMware vSphere®, Microsoft Hyper-V, Citrix Hypervisor, and other server virtualization platforms. While other third-party server virtualization platforms may work, PowerSchool does not endorse or provide direct support for any third-party server virtualization platform.
- This document addresses the fundamentals of server virtualization can be applied across various third-party server virtualization platforms.
- The server virtualization environment does not need to be dedicated exclusively to virtualized PowerSchool SIS servers, but you need to ensure there are ample compute resources such as processors, memory, and storage available to the virtualized PowerSchool SIS servers.
- This document does not cover advanced server virtualization features such as automated virtual machine provisioning, migration of live virtual machines between hosts, or centralized control and optimization of the virtual machine environment. Please contact your PowerSchool account executive or email [TSGHelpDesk@powerschool.com](mailto:TSGHelpDesk@powerschool.com) for consultative services on these advanced server virtualization features.

## Server Virtualization Configurations

Planning your server virtualization environment involves detailing all aspects of the underlying technical IT infrastructure as well as server resource utilization. The compute resources such as processors, memory, and storage must meet the PowerSchool SIS system requirements regardless of whether the deployment is virtualized or physical. Each district will vary in configurations, however the information listed below should be used as a guideline when provisioning hardware, storage, and networking to support server virtualization with PowerSchool SIS. When provisioning physical hardware (servers, storage, networking) for server virtualization you should always check with the server virtualization platform provider to ensure the physical hardware you intend to use within the server virtualization environment is compatible with the server virtualization platform you intend to use.

### Processor Guidelines

- Ensure the server virtualization platform provider's licensing model covers the number of cores per processor you intend to use on the physical host.
- Ensure the processor models you intend to use on the physical host are listed on the server virtualization platform provider's compatibility list.
- If utilizing fail over capabilities between physical hosts, utilize the same processor model in all your physical hosts.
- Utilize processor models that support 20M Cache and at least 1600MHz Max Memory speeds.
- Utilize processor models that support Second Level Address Translation (SLAT) features, which reduces overhead and improves virtualization performance.
- Provision enough CPU cores to meet your server virtualization workload.

### Network Connectivity Guidelines

For optimal network performance in a server virtualization environment it is recommended that the physical host be configured with a dedicated network card (port) for management of the physical host, one or more dedicated network cards (ports) for virtual machine network traffic, and one or more dedicated network cards (ports) for shared storage connectivity (if applicable).

- Utilize Gigabit (GbE) network cards that are capable of TCP Offload Engine (TOE) features on the host server whenever possible. This will offload TCP/IP check sum operations from the CPU to the network adapter.
- Configure separate network adapters or ports for virtual host management and virtual machine traffic.
- Configure separate network adapters for iSCSI Storage Area Networks (SAN) connections.
- Ensure physical switch ports are set to the same speed and duplex settings as the physical NIC.
- The latest drivers from the manufacture should also be applied on the physical host.
- Converged Networking deployments should utilize 10GbE.

- If possible, enable the use of Jumbo Frames on the interface utilized for iSCSI Storage Area Networks (SAN) connections.

## Memory Guidelines

- Ample memory should be provisioned based upon the number of virtual machines being deployed.
- Avoid over committing the amount of physical RAM in the host to the total amount of virtual machine memory being allocated.
- When provisioning the amount of physical RAM on the host be sure to include any virtual machine memory overhead that may be required.

## Disk Subsystem Guidelines

- When deploying the disk subsystem to house virtual machine files, consider utilizing multiple disks in a RAID configuration with the fastest disk speeds available to reduce disk contention. Utilize 15k SAS drives or SAS solid-state drive (SSD) technology for optimal performance. Serial ATA (SATA) drives are not recommended as they will dramatically degrade virtualization performance with PowerSchool SIS.
- When utilizing a Storage Area Network (SAN) to house virtual machine files, utilize a traditional SAN solution with dedicated controllers that support hardware RAID levels.
- Ensure your disk controller is on the server virtualization platform provider's compatibility list.
- Allocate ample storage for the virtual machine guest operating systems, as well as the PowerSchool SIS application, database, and backups. Virtual machine files are stored as virtual machine disk format (VMDK) files on the host VMFS volumes. Each virtual machine creates its own swap file when the virtual machine is initially started. For this reason, be sure to allocate overhead on the host storage when creating virtual disks.
- With Microsoft Hyper-V deployments ensure ample storage is available on the physical host server to accommodate the Windows paging file.
- With Microsoft Hyper-V deployments ensure to deploy virtual machine files on separate NTFS partitions that are separate from the physical host Windows Server operating system.
- Utilize Fixed VHD/Eager Zeroed Thick provisioned disks within the virtual machine for optimal performance.
- Do not utilize virtual SAN configurations across local server disks to house PowerSchool SIS virtual machine files as this may impact performance due to constant caching of data.
- iSCSI and Fiber Channel Storage Area Network (SAN) may be used to store the virtual machine files.

- This document does not capture storage requirements as it relates to virtual machine snapshots or cloning. If you intend on using virtual machine snapshots or cloning, ensure you have ample storage for those requirements.

## Microsoft Licensing

- The current Microsoft Windows Server **Standard** edition license will entitle you to run up to two (2) virtual machines per each license, per physical host server.
- The current Microsoft Windows Server **Datacenter** edition license will entitle you to run unlimited virtual machines per each license, per physical host server.
- A Microsoft Windows External Connector License (ECL) is also required for each physical host server that will house virtual PowerSchool Tomcat application node(s) since the PowerSchool SIS application is a web application accessible from Internet to non-district employees (parents). A Windows External Connector License is not required for each virtual machine and does not replace actual Windows Client Access License (CAL) used by district personnel.



## Server Virtualization Performance Tips

The performance tips listed below are intended to assist with configuring virtualized environments to support PowerSchool SIS. Individual school policies and practices should be accounted for.

### Physical Host

- Utilize the fastest processors with ample cores to meet your needs.
- Provision the proper amount of physical RAM within the physical host server to accommodate all virtual machines plus any memory overhead required by the physical host.
- Do not overprovision compute resources such as virtual CPUs and virtual memory.
- Utilize a high-performance disk controller with at least 2GB battery backed cache.
- In SAN deployments, spread I/O loads over multiple available paths to the SAN storage processors.
- Utilize GbE or 10GbE Ethernet adapters on the physical host.
- Ensure network card speed and duplex settings match the associated network switch ports.
- Disable all power saving / power management features on physical host configurations.
- Ensure the physical host server BIOS configuration has “Virtualization Support” features enabled (if applicable).
- Disable any physical hardware in the physical host server BIOS that will not be used, such as Floppy Drives, COM ports, USB ports, LPT ports, and unused storage controllers.
- When installing the server virtualization platform on the physical host server, utilize the hardware manufacturer’s embedded or ISO image as it will contain specific drivers from the hardware manufacturer to support the server virtualization platform.
- If possible, enable the use of Jumbo Frames on the interface utilized for iSCSI SAN connections.
- Ensure virus scanning on the physical host server excludes scanning of volumes that contain virtual machine files.

### Virtual Machine Configurations

- Disable power management features.
- Disable any unneeded virtual hardware on the virtual machine operating system (Device Manager) such as COM ports, LPT ports, floppy disk controllers.
- Remove any unneeded hardware on the virtual machine properties such as floppy disk controllers.

- Configure the virtual machines to power on in the proper order when the physical host is restarted.
- Configure virtual machine time synchronization to a valid NTP source, not the physical host server.
- Within the virtual machine/virtual CPUs configuration mimic the physical characteristics of the host's physical processors. If the physical host contains (2) physical processors with multiple cores, the virtual machine should have (2) virtual CPU sockets assigned with applicable virtual cores per virtual CPU socket. Virtualization CPU requirements for PowerSchool SIS can contain any number of virtual cores across multiple virtual CPU sockets.
- Within the virtual machine/virtual disk(s) ensure the disks are "thick" provisioned (Fixed VHD/Eager Zeroed Thick) rather than "thin" or "dynamically" provisioned. This will essentially increase performance on the Oracle server so that when the redo logs are written and database grows, it will not be affected by any latency waiting for the physical server virtualization platform to allocate disk space.
- Refer to the server virtualization platform's documentation for virtual machine/virtual SCSI controller to meet the best possible performance.
- Monitor and apply updates from the server virtualization platform provider for the server virtualization environment.
- After applying server virtualization platform updates, ensure the virtual machines are updated as well (if applicable).
- Run virtual machine disk files on separate physical disk configurations that are not the same physical disks being used by the physical server host operating system / hypervisor files.

## PowerSchool and Server Virtualization Environments

This guide outlines server virtualization environments known to be conducive with very specific large-scale implementations of PowerSchool SIS. PowerSchool recognizes the benefits of leveraging server virtualization and the wide range of options available to our customers outside of this document as potentially viable solutions.

While we do not test and collect data for all server virtualization solutions, we do believe that our application lends itself well to server virtualization, allowing it to make more efficient use of available hardware resources beyond what is sometimes possible with a single install on dedicated hardware. As a result, we encourage our customers to pursue server virtualization solutions when they make sense for meeting business needs.

### A Note on Technical Support for PowerSchool in a Server Virtualization Environment

PowerSchool provides application support for the PowerSchool SIS application itself when it has been deployed within a server virtualization environment. However, PowerSchool does not provide direct support for the configuration and performance of the server virtualization environment itself within the definition of PowerSchool Technical Support.

### What Does This Mean?

If PowerSchool Support, through the course of a technical support interaction, suspects an application, performance, or stability issue related to inadequate system resources or server virtualization configuration, it would be the responsibility of the district server administrator to address these issues, whether the root of the issue be physical or virtual in nature. If the cause of such an issue cannot otherwise be identified, it may ultimately become necessary to isolate the PowerSchool SIS installation to dedicated, physical hardware, removing server virtualization from the environment, to rule out any server virtualization-induced issues. If this becomes necessary, the customer will assume any and all responsibilities and/or costs associated with the redeployment of PowerSchool SIS and its associated resources.

While PowerSchool promotes the use of its PowerSchool product in conjunction with server virtualization, PowerSchool assumes customer subject matter knowledge of, as well as ownership and responsibility for, the server virtualization solution on which it has been deployed.