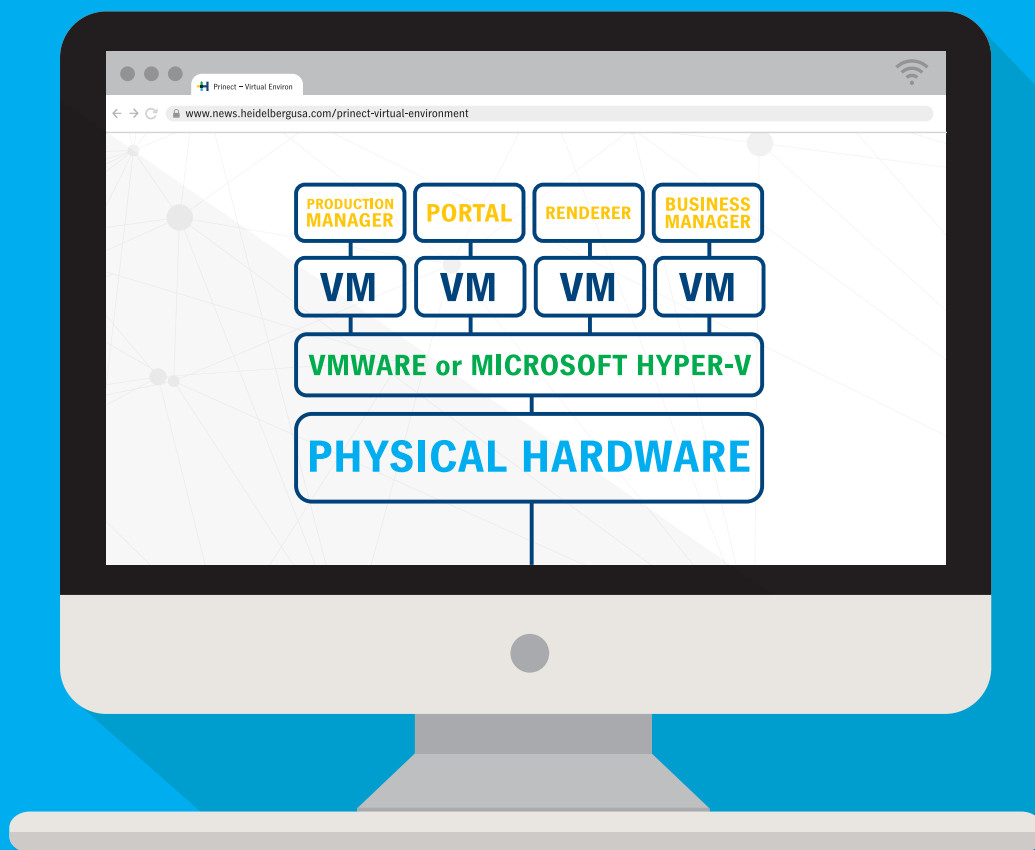




Technical White Paper

Working in a Virtual Environment with Prinect



How can I run Prinect virtually?

Here are our guidelines:

Heidelberg USA, Inc. frequently gets inquiries from customers about whether Prinect® Workflow will run in a virtual environment. In principle, Heidelberg develops all Prinect applications software to run on Microsoft® Windows™, and Hypervisor manufacturers like VMWare® also develop their software to run Microsoft Windows. So, while we do not design, develop or test our software to run on the various hypervisors, the transitive properties should apply, i.e., if our software runs on MS Windows, and MS Windows runs on a virtual machine, then our software will run on a virtual machine. Outside of some limitations (described in this document), Prinect can be virtualized, and customers around the world have been successfully doing this with VMWare, Microsoft Hyper-V and Stratus® everRun®.

Below, please find our guidelines for using Prinect Production Manager 2020.10 in a virtual environment.

Please Note: It is strongly recommended that you have a Prinect Software Maintenance Agreement for your Heidelberg Prinect Workflow. Additionally, starting with Prinect 2018, Heidelberg has introduced “Online Licensing” for Prinect. This is the preferred method for product licensing and is more conducive for virtual installations compared to customers that still use a USB dongle for product licensing.

Installing the Virtual Environment

Any implementations of Prinect in a virtual environment will be treated as a special project and additional service charges may apply depending on the scope of the project. There are different considerations for a new install versus an upgrade. If an existing user wants to migrate from physical to virtual, it will require additional discussion and planning, but it is possible. We need a detailed technical description of the target environment you plan on running Prinect in.

New virtual implementations should begin with a fresh installation. You cannot do a Physical-to-Virtual (P2V) conversion because Dell® PowerEdge™ servers (that Heidelberg uses for Prinect Workflow) use an Embedded Microsoft Windows License, which does not permit the conversion. Regardless, you also will face challenges of hardware incompatibility, HAL errors, legacy software issues, etc.

What Cannot Be Virtualized

Prinect Shooter 2 and Online Prinect Renderer applications are not supported in a virtual environment. It is not desirable to do this since the computer that runs these applications needs to be physically located near the CTP device (the connection is via a 15-Meter shielded CAT6 cable). The computer and CtP should be viewed as one integrated unit as it does the raster buffering for the CtP, and if there are issues, there will be image defects burned onto your plates.

The connection between the computer and CtP is handled by a limited production and proprietary PCI-e interface card known as the SWAY. Heidelberg certifies and extensively tests only certain physical platforms to be fully compatible with the SWAY and ensures the PCI-e bus and Disk I/O implementations are fast and consistent enough to be considered for use as Prinect Shooter workstations.

Using the Renderer in a Virtual Environment

In a virtual environment, it doesn't always make sense to run a separate Renderer server or VM. You don't have the I/O traffic to transfer the files to and from one (virtual) system to another – or worst case, within the same storage device. In virtual environments, the internal Renderer is recommended (of course, the host must be powerful enough – but if you don't have enough performance, you should not run virtual Prinect anyway).

In a “real” physical hardware environment, it is not as easy to answer. You need to look at the Prinect workflow server workload to decide what to do – placing the Renderer on a second server creates additional overhead (for file copying, Prinect-internal management, etc.). On the other hand, the Renderer performs better with a higher CPU frequency, while the Prinect workflow server prefers a system that is optimized for multi-threading. Placing the system on the best-fit-systems might improve performance.

What Hypervisors Can Be Used

There are several hypervisors, for example, VMWare, Hyper-V, that you could use to provide the virtual host. Each of these hypervisors has their own pros and cons. Choice is predominantly based on what the customer already has or is familiar with. Regardless of which hypervisor you choose, Heidelberg USA, Inc. does not provide technical support for the hypervisor. In a virtual installation, we only support our Prinect applications. If there is a question or problem with the hypervisor or if a newer version comes out that is incompatible, it is outside of our control and our realm of expertise. We recommend having IT Staff on-site familiar with your virtualization implementation.

Microsoft Windows Licenses

A valid Windows license is required for each Virtual Machine and must be provided by the customer. Any new installations in a virtual environment must be based on 64-bit Microsoft Windows Server 2019 (preferred), Microsoft Windows 2016 or Microsoft Windows 2012 R2 server operating system and Prinect 2020.10 software or higher.

As far as Client Access Licenses (CALs), Heidelberg typically includes 5 User CALs in our physical environment. You will have to determine what the needs of your business are for your virtual environment. Currently, Windows Server 2019 CALs are recommended as they are backwards compatible. Windows Server 2019 CALs may be used to access Windows Server 2016, but Windows Server 2016 CALs may not be used to access Windows Server 2019. They would have to be repurchased if and when you migrate to Windows Server 2019.

Please note that Microsoft has special rules regarding their licensing agreements that pertain to virtual environments. Please take care not to violate their rules.

Best Practices

As far as “Best Practices” for configuration of VM’s for Prinect applications, we recommend matching our physical environment as follows:

- CPU: Minimum 8 vCPUs
- Memory: Preferred 64-GB, Minimum 32-GB
- Network: Minimum 1-GbE, recommended 10-GbE
- Storage: It is possible to use shared storage or local storage. If you choose to run in a shared storage environment, very fast access is the key. For example, our internal systems use Fibre Channel (FC) to connect the storage.

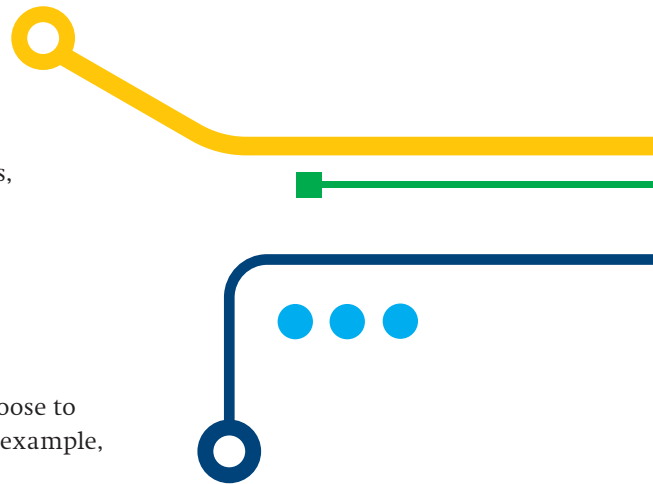
Below, please find a list of the roles and features that should be added to those already set on the Windows 2019 server:

Roles:

- File server
- Print and Document Services

Features:

- .NET Framework 3.5 Features
- LPR Port Monitor
- Remote Server Administration Tools (default selections)
- SNMP Service with SNMP WMI Provider
- Telnet client
- Windows server backup
- XPS Viewer



Drive C	The Boot/OS volume. This is used for the SYSTEM drive and will hold MS Windows 2019, SQL Server 2012, Heidelberg Prinect software as well as 3rd party software like Anti-Virus and/or Backup software. We recommend 300-GB for the SYSTEM drive. We also allow for growth with new OS updates and updates/upgrades to our software.
Drive D	The TEMP volume. This is used for TEMP data and has the database mirror, logs and some backups of critical configuration. We recommend 300-GB for the TEMP drive. Although this volume does not contain critical run time data, it does contain data that is needed to rebuild Prinect workflow should it be necessary to do so.
Drive E	The Data Volume. This volume contains critical data needed for Prinect workflow to operate and includes the live Prinect XML configuration data, the JDF job data, PDF files, log files and MSSQL database files. We recommend 2.4-TB for the DATA drive. In the case of a Prinect Pressroom Manager installation, you would be safe with about 600-GB of storage. In this case, it holds the job data, Prinect Signstation resources if applicable, log files, our Prinect Environment and the SQL Server database instance. In the case of Prinect Business Manager installation, you would be safer with about 300-GB of storage.

Please Note: It is very important that you do not overcommit hardware resources. For example, if you have 32-GBs of physical RAM and allocate 4 VMs with 12-GB of memory each, it would total more than the physical memory that is available.

Optimizing performance:

The potential for performance degradation exists with virtual and can depend on many factors, for example, software version and options, your infrastructure, your hardware environment including BIOS levels and firmware, the configuration of your virtual hosts/virtual machines, and/or your workload. Note that virtualization is an ever-changing environment so as new things emerge, performance and compatibility can be affected.

Knowing your Applications

Please pay very close attention to the applications running on a single virtual server. You can easily inadvertently configure all virtual machines to create Disk I/O and/or Network I/O contention. Ultimately, it depends on your workload and how much horsepower exists in the environment, but mixing the wrong applications on the same virtual host could result in noticeable performance degradation. In particular, we have seen issues with running other VMs on the Virtual Host running the Prinect Server.

Prinect is a new environment for many mainstream IT professionals and, as such, when introducing special elements such as virtualization, it is always a good idea to invest in Prinect IT training to provide your IT staff with a more comprehensive understanding of the architecture and required routine system maintenance.

The more applications you run on a single server, the more risk you have that you can lose access to applications or data because of unplanned downtime. Since most of our customers are printers, whose core business is printing and often do not have on-site IT Staff, another potential issue is the time required to get production moving again in the event of a failure.

As a result, when you run your production workflow in a virtualized environment, it is crucial to have a good disaster recovery/business continuity plan because if the server fails, your production is stopped. We strongly recommend using some kind of Data Protection product to protect your investment and your business.

High Availability Features

A big driver for Prinect in a virtual environment is the High Availability (HA) features. There are, of course, high availability configurations possible; however, those require more investment in hardware and licenses as well as an increased skill set. However, Microsoft has very specific rules about running their software in HA environments – especially with regards to Microsoft SQL Server, so make sure you are compliant, particularly as it relates to their Software Assurance requirements.

If you require “High Availability” in a virtual environment for Prinect Data Center, our embedded version does not provide the necessary licenses from Microsoft to be legal, so you would have to provide your own Microsoft SQL Server license.

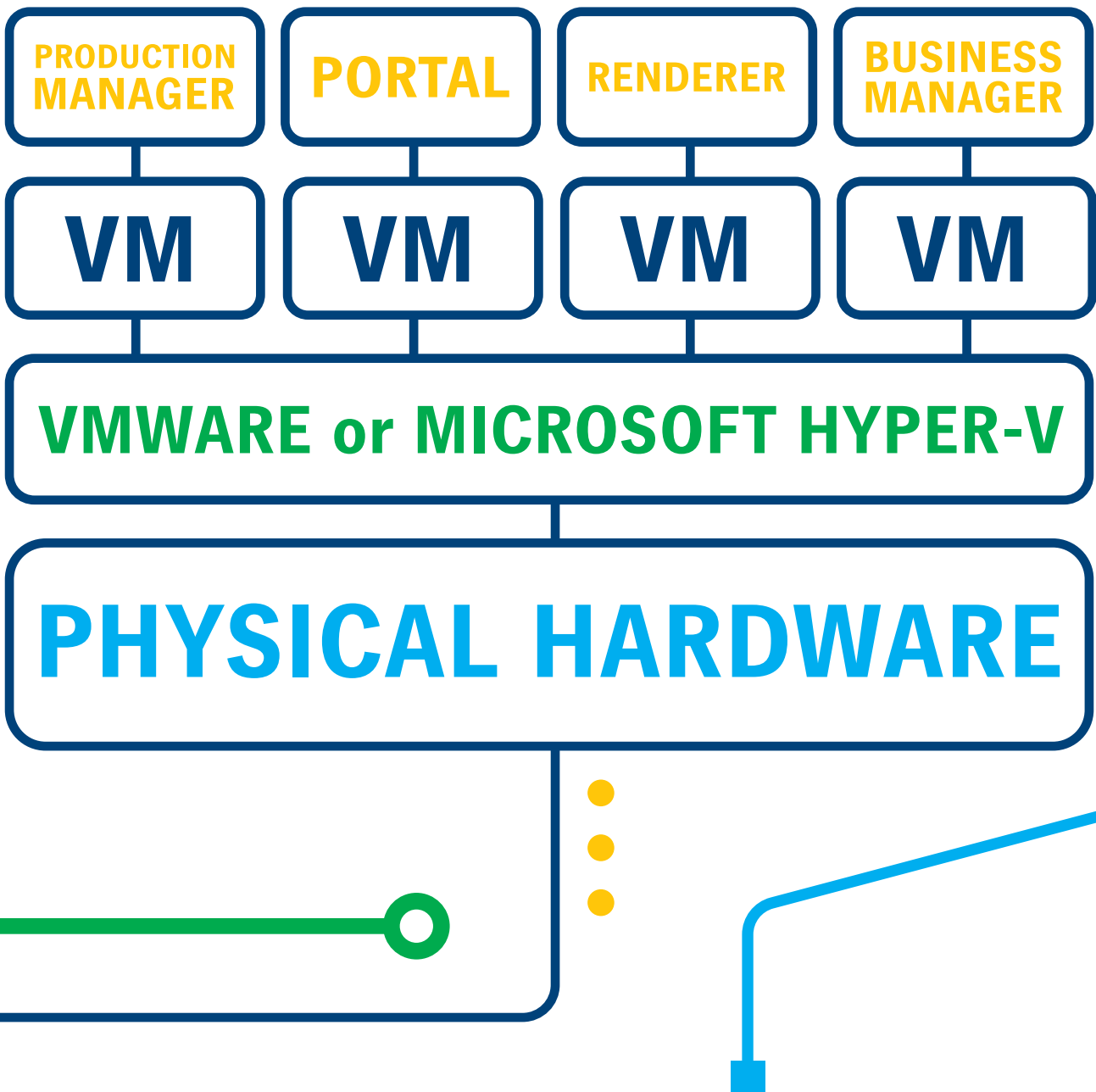
Using the Reverse Proxy in a Virtual Environment

If you use Prinect Portal or Business Portal, which require a Reverse Proxy, the Reverse Proxy can run on a Virtual Machine; however, we don't recommend running on the same Virtual Host as the Prinect applications it will be communicating with as this would not conform to PCI-DSS Standards.

Summary:

The guidelines are intended to set expectations correctly and help you make informed decisions to ensure you get the best Return On Investment (ROI) and the lowest Total Cost of Ownership (TCO) on any changes to your infrastructure. Don't expect to save money with your initial steps into a virtual world, but server consolidation can help control costs and utilization in the long term. Heidelberg USA, Inc. will assist you on this project to achieve a right-sized, future-proofed and worry-free solution for your business. If you would like to pursue this, please contact your Account Manager or Prinect CTP Sales Representative.

To view or download all of our Technical White Papers visit: <https://news.heidelbergusa.com/whitepapers/>



Please direct any questions regarding this document to Eugene F. O'Brien, Senior Technical Support Analyst at: (770) 794-6205 or eugene.obrien@heidelberg.com

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