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Lab Overview - HOL-1706-USE-7 - SAP on VMware SDDC: Overview

Lab Guidance

Note: It will take more than 90 minutes to complete this lab. You should expect to only finish 2-3 of the modules during your time. The modules are independent of each other so you can start at the beginning of any module and proceed from there. You can use the Table of Contents to access any module of your choosing.

The Table of Contents can be accessed in the upper right-hand corner of the Lab Manual.

This lab will give an overview of key VMware technologies and practices for SAP, including three modules related to general SDDC topics, and three modules specific to the VMware Adapter for SAP LVM.

Lab Module List:

- [Module 1 - VMware Virtual Volumes with SAP](#) (15 minutes) (Advanced)
- [Module 2 - VMware NSX with SAP](#) (15 minutes) (Advanced)
- [Module 3 - vRealize Operations with SAP](#)(15 minutes) (Basic)
- [Module 4 - VMware Adapter for SAP LVM: Provisioning](#)(15 minutes) (Advanced)
- [Module 5 - VMware Adapter for SAP LVM: Mass Operations](#)(15 minutes) (Advanced)
- [Module 6 - VMware Adapter for SAP LVM: Application Migration](#)(15 minutes) (Advanced)
-

Lab Captains:

- **Modules 1-3**
 - Bob Goldsand, Senior Staff Partner Architect, Global Alliances, US
- **Modules 4-6**
 - David Gallant, Product Management Field Architect, US
 - David Bacon, Sr. Engineering Manager, SAP Solution, US
 - Dirk Karjack, Architect, SAP Solution, US

This lab manual can be downloaded from the Hands-on Labs Document site found here:

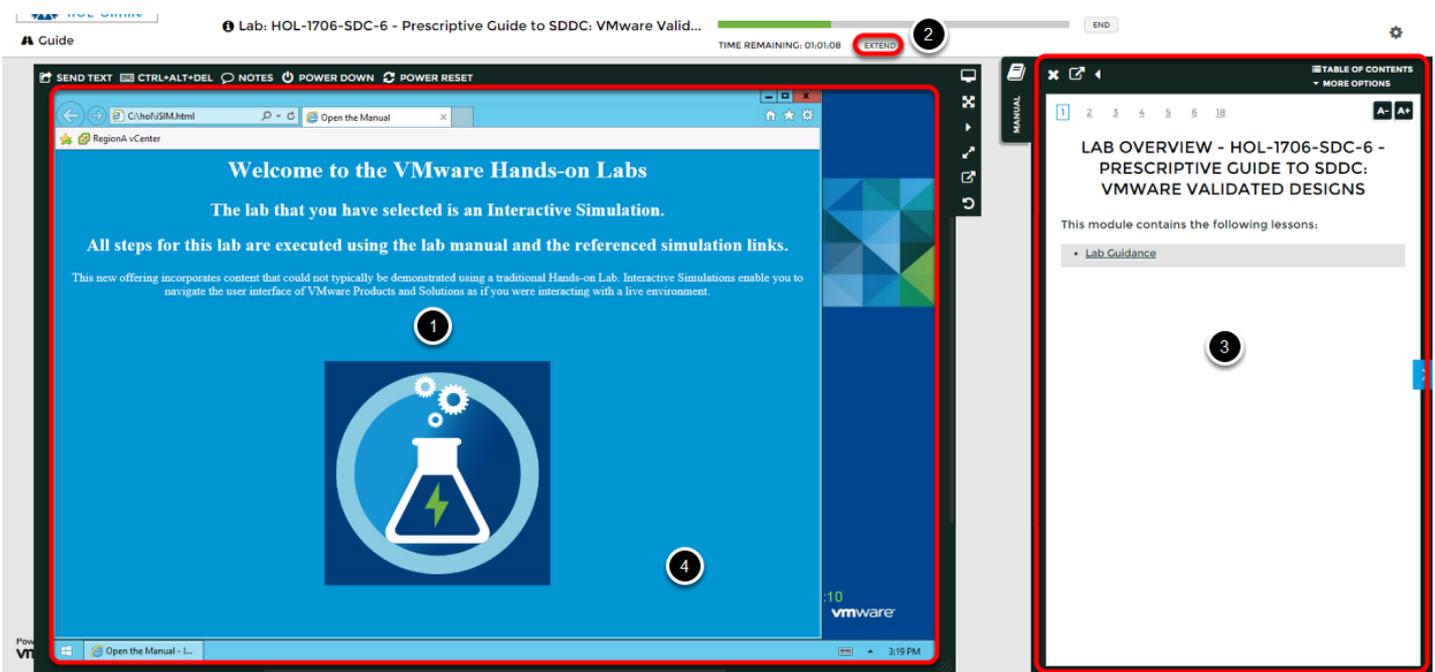
[\[http://docs.hol.pub/HOL-20171\]](http://docs.hol.pub/HOL-20171)

This lab may be available in other languages. To set your language preference and have a localized manual deployed with your lab, you may utilize this document to help guide you through the process:

<http://docs.hol.vmware.com/announcements/nee-default-language.pdf>

Location of the Main Console

1. The area in the RED box contains the Main Console. The Lab Manual is on the tab to the Right of the Main Console.
2. You will not need to use the Main Console in this lab. All steps for this lab are executed using the lab manual and the referenced simulation links.
3. Your lab starts with 90 minutes on the timer. The lab can not be saved. All your work must be done during the lab session. But you can click the **EXTEND** to increase your time. If you are at a VMware event, you can extend your lab time twice, for up to 30 minutes. Each click gives you an additional 15 minutes. Outside of VMware events, you can extend your lab time up to 9 hours and 30 minutes. Each click gives you an additional hour.



Module 1 - VMware Virtual Volumes on Hitachi with SAP (15 minutes)

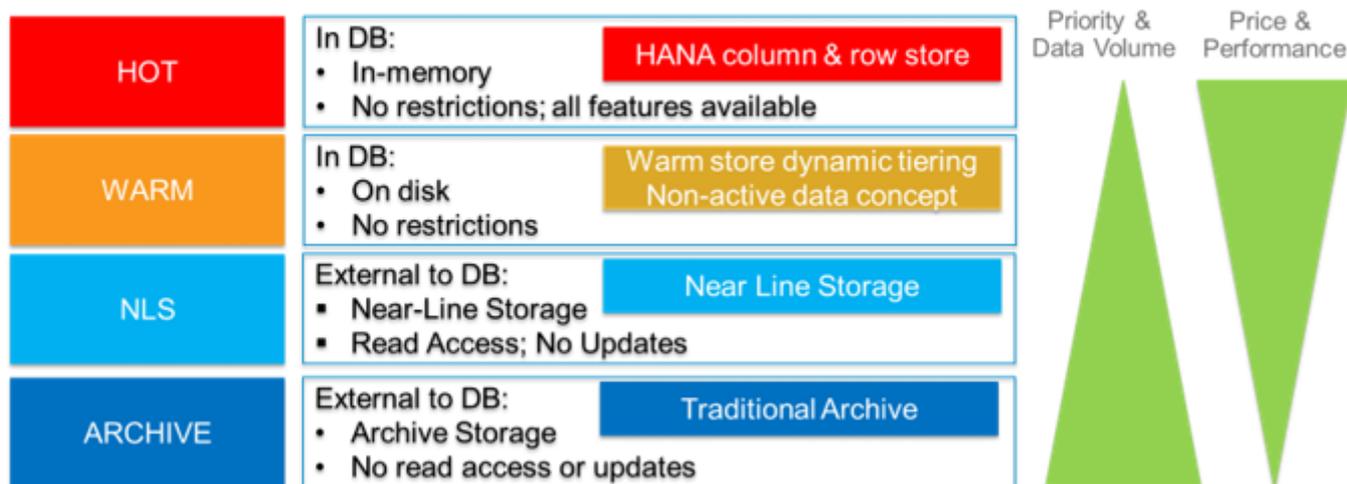
Introduction

This lab will go through the use case, definition, and creation of virtual volumes based on SAP’s mission critical database and data management strategy. SAP Multi-Temperature Data Management strategies and techniques can significantly reduce the size and cost associated with SAP HANA’s in-memory footprint. Show how SAP and VMware customers can leverage multi-temperature strategies, where data is classified by frequency of access as either hot, warm or cold depending on data usage is the essence of Software-Defined Storage.

SAP Information Lifecycle Management examines the value of data to the business over time. To bring the concept of the Software-Defined Data Center and more precisely Software-Defined Storage to reality, see Figure 1. This table depicts the various storage options for SAP HANA so customers can create an architecture that aligns with the business and its applications demands.

Figure 1: Software-Defined Storage Aligns Business and Application Needs

SAP HANA Multi-Temperature Data Management



High Level Architecture of vSphere 6.0 Virtual Volumes

This section provides a high level architecture and describes the components of Virtual Volumes. As shown in Figure 2, Virtual Volumes are a new type of virtual machine object which are created and stored natively on the storage array. The Vendor Provider also known as the VASA Provider, which are the vSphere Storage APIs for Storage Awareness (VASA) that provide the storage awareness services and mediates out of the box

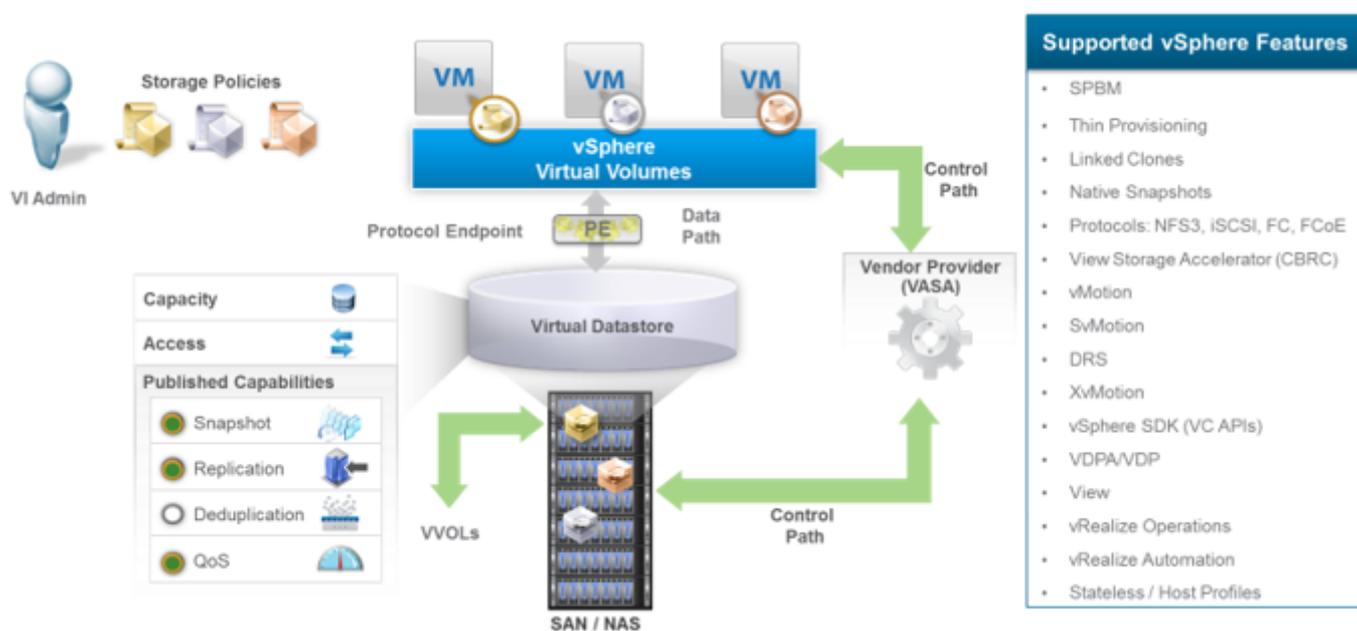
communications between vCenterServer and exi Hosts on one side and the storage system on the other side.

The storage containers are pools of raw storage that a storage system can provide to virtual volumes and unlike LUNS and NFS, they do not require pre-configured volumes on the storage side. Also with virtual volumes you still have the functionality you would expect when using native VMDKs

Virtual Datastores represents a storage container in a vCenter Server instance, so it's a 1:1 mapping to the storage systems storage container. The ESXi Hosts have no direct access to the virtual volumes on the storage side, they use a logical I/O proxy called a protocol endpoint and as you would expect VVOLS are compatible with industry standard protocols, iSCSI, NFS, FC, and FCoE

The Published Storage Capabilities will vary by storage vendor depending on which capabilities have been exposed and implemented. In this lab we will be looking at the exposed capabilities Hitachi Data Systems like latency, throughput, Raid Level, Drive Type/Speed, IOPS, and Snapshot frequency to mention a few.

Figure 2: vSphere Virtual Volumes Architecture and Components



Hands-on Labs Interactive Simulation: VMware Virtual Volumes with SAP

The interactive simulation will allow you to experience steps which are too time-consuming or resource intensive to do live in the lab environment.

1. [Click here to open the interactive simulation.](#) It will open in a new browser window or tab.
2. When finished, click the “Return to the lab” link to continue with this lab.

Module 2 - VMware NSX with SAP

Introduction

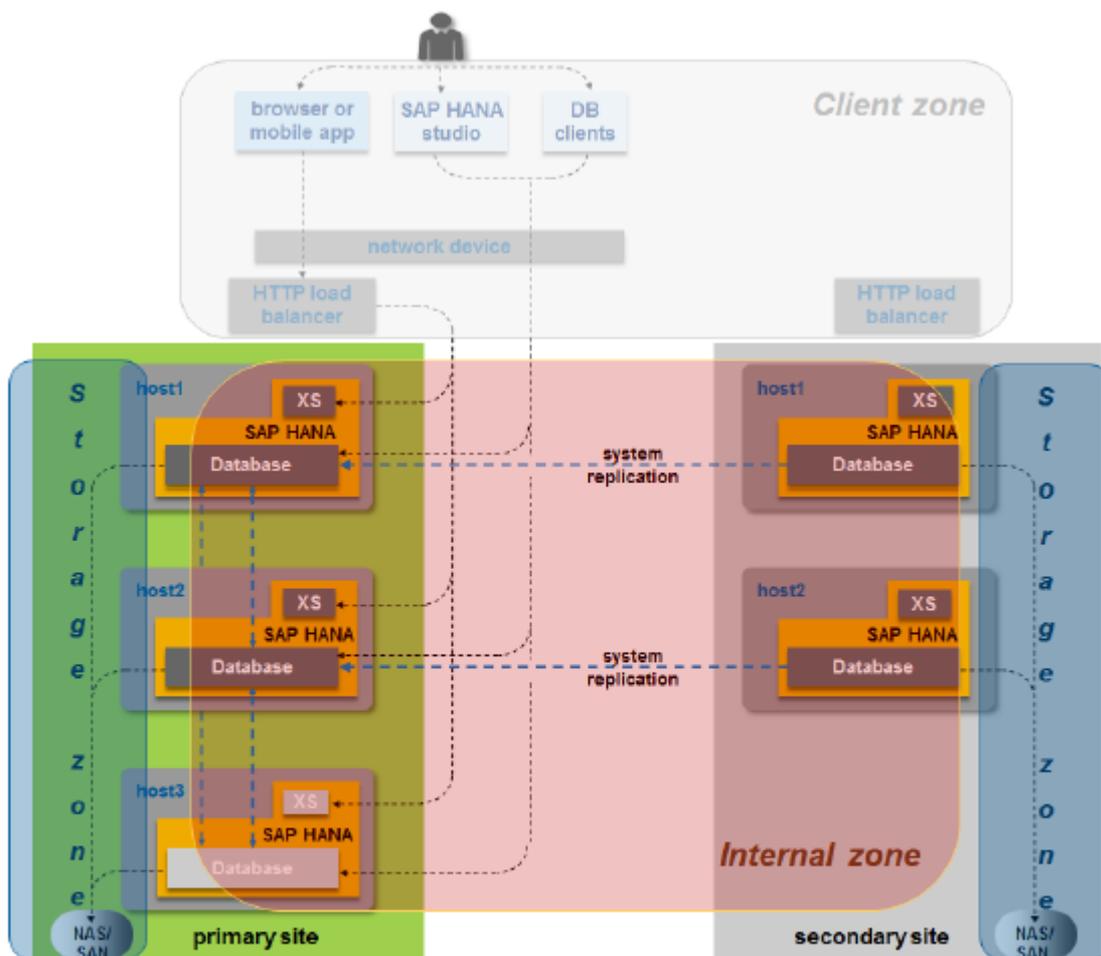
In this lab we will go over the creation of an NSX logical Switch associated with the internode communications in an SAP HANA Dynamic Tiering environment. This type of internode communications logical switch can also be used in a SAP HANA Scale Out architecture. Before getting into the lab, we will take a look at the SAP HANA Network Requirements Guide to gain an understanding of the network topology followed by a high level introduction to VMWare NSX.

Network Zones For SAP HANA

Figure 1 is an excerpt from the SAP HANA Network Requirements Guide showing the various communications zones or tiers. In the Client Zone access is granted to different clients, such as the SQL clients on SAP application servers. In addition there are also browser applications using HTTP/S to access the SAP HANA server, as well as other data sources (such as BI) which need a network communication channel to the SAP HANA database

The internal zone covers the communication between hosts in a distributed SAP HANA system as well as the communication used by SAP HANA system replication between two SAP HANA sites.

The Storage Zone, although SAP HANA holds its data in memory, SAP HANA is a fully ACID compliant relational database so data also persists on storage. SAP HANA data need to be accessed via a network to provide protection against power failures or in the events hosts becomes unavailable



- Client zone:** Network for SAP application servers, HTTP and SQL clients
- Internal zone:** Internode and System Replication Network
- Storage zone:** Enterprise Storage Network and Backup Network

Logical Network Connections Per HANA Server

Figure 2 contains the SAP HANA logical network connections as defined in the requirements guide. SAP recommends proper network segmentation and security within the zones and logical network connections. We will use these technical requirements and use cases to define our NSX virtual network design.

This section will provide a high level overview of what NSX is, its architecture, and components. Think of NSX as a network hypervisor - with NSX you now have the ability to abstract and reproduce a complete set of layer 2 to layer 7 networking services like switching, routing, firewalling and load balancing in software

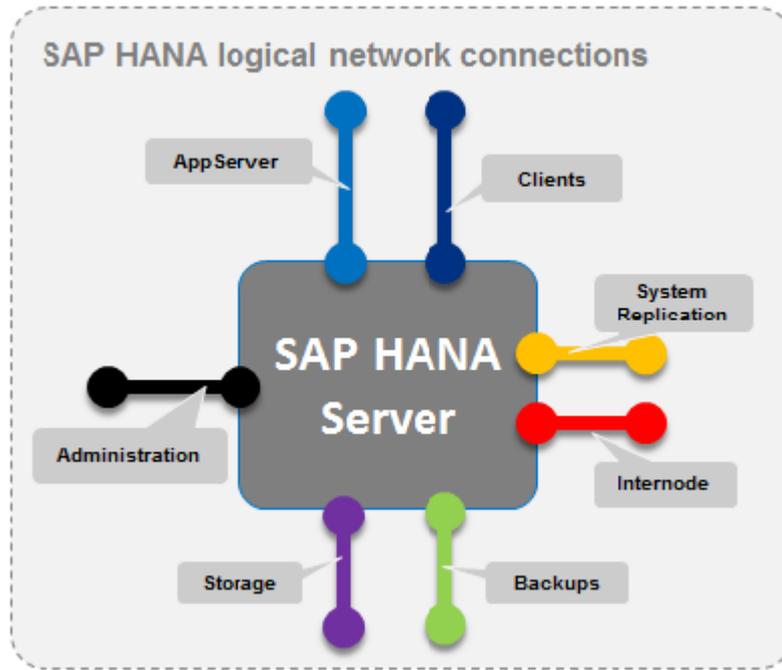
NSX network virtualization is just like when creating virtual machines and abstracting a physical servers CPU, RAM, Storage, and NICs. Also like a virtual machine, NSX can be centrally managed to create any combination of network services, to produce unique, isolated virtual networks quickly and dynamically. These virtual networks are independent of the underlying network hardware, which allows IT to treat the physical network as a pool of transport capacity that can be consumed and repurposed on demand.

It's helpful to understand NSX by first looking at what's available with core ESXi, with core ESXi you can create standard switches and distributed switches:

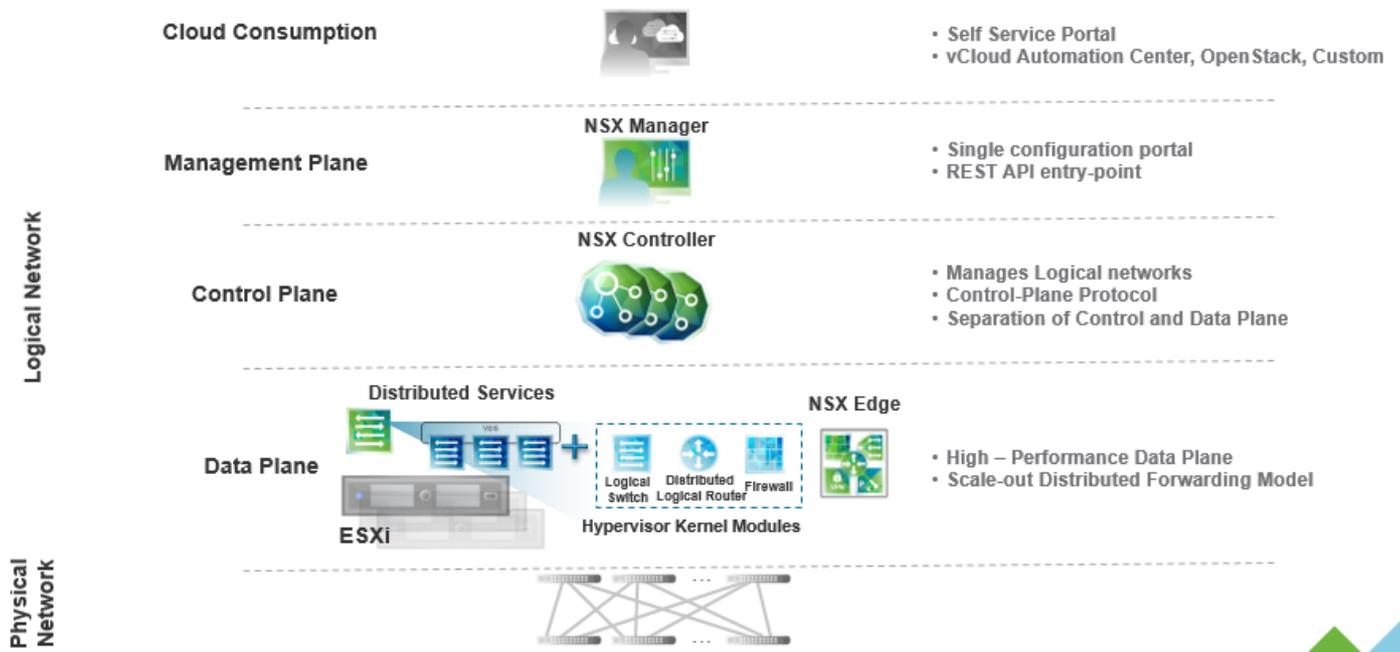
- Standard switches manages virtual machine and networking at the host level
- While Distributed Switches manages virtual machine and networking at the data center level, essentially centralized management and deployment across multiple Hosts

The Virtual Distributed Switch (VDS) is a building block for the NSX-v architecture. With NSX you can create "logical switches", which among other things can span multiple virtual distributed switches. The use of logical switches is entirely consistent with Tier1/ Mission Critical deployments; our best practice recommendations prior to NSX always say to use virtual distributed switches for the reasons outlines above.

To expose these NSX capabilities seen in the data plane, you install VMware Installation Bundles (VIBs) which are a collection of files that get installed in the Kernel space of the ESXi hypervisor to enable the functionalities requested in the NSX-v architecture. The Controller cluster in the NSX platform is the control plane component that is responsible in managing the switching and routing modules in ESXi. For the Management Plan - NSX manager provides the single point of configuration in vSphere environment for NSX. In a vSphere environment this is accomplished via the vSphere Web UI to deploy NSX functional services and as well as integration to the cloud



VMware NSX Overview, Architecture, & Components



Hands-on Labs Interactive Simulation: NSX Logical Switching with SAP

The interactive simulation will allow you to experience steps which are too time-consuming or resource intensive to do live in the lab environment. In this case we will simulate a full SAP environment and set up a logical switch with NSX.

1. [Click here to open the interactive simulation.](#) It will open in a new browser window or tab.
2. When finished, click the “Return to the lab” link to continue with this lab.

Module 3 - vRealize Operations with SAP

Introduction

VMware's vRealize Operations provides best of breed monitoring for your virtual infrastructure. With the addition of Blue Medora, you can extend this monitoring to your entire stack. Monitor from application to server using Blue Medora Management Packs. With VMware & Blue Medora you can see key metrics around Health, Availability and Capacity for your entire datacenter.

In this lab we will focus on two Management Packs provided by Blue Medora: SAP & SAP Hana. We will not only show you how to get started using these management packs but how to create your own dashboards using the metrics provided.

Hands-on Labs Interactive Simulation: vRealize Operations with SAP

The interactive simulation will allow you to experience steps which are too time-consuming or resource intensive to do live in the lab environment. In this case we will simulate a full SAP environment and set up monitoring with vRealize Operations.

1. [Click here to open the interactive simulation.](#) It will open in a new browser window or tab.
2. When finished, click the “Return to the lab” link to continue with this lab.

Module 4 - VMware Adapter for SAP LVM: Provisioning

Introduction

In this module we will learn how to simplify the provisioning of SAP systems by utilizing the SAP Landscape Virtualization Manager (LVM) and the VMware Adapter for SAP LVM using the System Clone and Copy copy process. Both processes are well known to basis admins and are frequently used to build new SAP systems. SAP Landscape Virtualization Manager allows to automate this highly complex task and free the basis admins to perform more valuable work. In combination with the VMware Adapter for SAP LVM the basis administrator gains controlled access to infrastructure components and can now independently perform copy and clone operations without the need of an infrastructure administrator.

In the provisioning tab of the SAP Landscape Virtualization Manager we can find the following provisioning operations:

Clone: Create a duplicate of an existing system with an identical system ID. To avoid conflicts with the original system, the cloned system is isolated from the rest of the landscape.

Copy: Create a duplicate of an existing system with a different host name and a unique system ID.

System Refresh: Overwrite an existing target system with the latest data from a source system while maintaining the configuration.

Refresh a database: to keep the configuration settings of your application instances such as central instance (CI), dialog instance (DI), and so on.

System Rename: Change system ID, host names, instance numbers, and mount points from the source system to the target system.

Related Information published on SAP site:

- SAP Note 1709155 - System Provisioning with SAP Landscape Virtualization Management
- SAP Note 2050537 - SAP Landscape Virtualization Management 2.1 Enterprise Edition - Support for SAP HANA
- SAP Note 1767253 - SAP's recommended approach to system copy
- SAP Note 2077756 - SAP Landscape Virtualization Management - Supportability Information for System Provisioning Templates
- ABAP Post-Copy Automation Installation Guide for Enterprise Edition
- ABAP Post-Copy Automation Configuration Guide for Enterprise Edition
- BW Post-Copy Automation Configuration Guide for Enterprise Edition
- Java Post-Copy Automation Guide for Enterprise Edition
- Near-Zero Downtime Maintenance Java
- SAP Landscape Virtualization Management Best Practices for System Provisioning

About VMware Adapter for SAP LVM

VMware Adapter for SAP LVM integrates SAP LVM with VMware Software Defined Datacenter (SDDC) Technologies enabling automated provisioning and management of a virtualized SAP system.

VMware Adapter for SAP LVM empowers SAP BASIS Administrators to rapidly clone, copy, refresh, mass stop, start and migrate SAP systems between hosts, storage and network devices.

VMware Adapter for SAP LVM is distributed as free virtual appliance which with a few simple easy steps deploys all the required components to integrate SAP LVM, vRealize Orchestrator and with vCenter Server.

For more information and to download the product go to: <http://www.vmware.com/products/adapter-sap-lvm.html>

Hands-on Labs Interactive Simulation: VMware Adapter for SAP LVM - Provisioning

This portion of the lab is presented as a Hands-on Labs Interactive Simulation. This simulation will enable you to navigate the software interface as if you are interacting with a live environment, and experience steps which are too time-consuming or resource intensive to do live in the lab environment.

1. [Click here to open the interactive simulation](#). It will open in a new browser window or tab.
2. When finished, click the "Return to the lab" link or close the windows to continue with this lab.

Module 5 - VMware Adapter for SAP LVM: Mass Operations

Introduction

About VMware Adapter for SAP LVM

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Hands-on Labs Interactive Simulation: VMware Adapter for SAP LVM - Mass Operations

The interactive simulation will allow you to experience steps which are too time-consuming or resource intensive to do live in the lab environment.

1. [Click here to open the interactive simulation.](#) It will open in a new browser window or tab.
2. When finished, click the “Return to the lab” link to continue with this lab.

Module 6 - VMware Adapter for SAP LVM: Application Migration

Introduction

In this module you will learn how to migrate an SAP instance using the SAP Landscape Virtualization Management together with the VMware Adapter for LVM.

There are many reasons why migration could be needed, for example moving workloads to new, higher-performance servers. Using the VMware Adapter for SAP LVM within the SAP LVM, the running instance can be moved to the new compute, storage and network resources, with no down time. After starting the operation, the LVM automates the complex set of steps required for a successful migration. The operation is completed with no functional errors, and assures no impact to SLA metrics.

About VMware Adapter for SAP LVM

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Hands-on Labs Interactive Simulation: VMware Adapter for SAP LVM - Application Migration

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1. [Click here to open the interactive simulation.](#) It will open in a new browser window or tab.
2. When finished, click the “Return to the lab” link to continue with this lab.

Conclusion

Thank you for participating in the VMware Hands-on Labs. Be sure to visit <http://hol.vmware.com/> to continue your lab experience online.

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