ESXi System Storage Changes

VMware Storage

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ESXi System Storage Changes

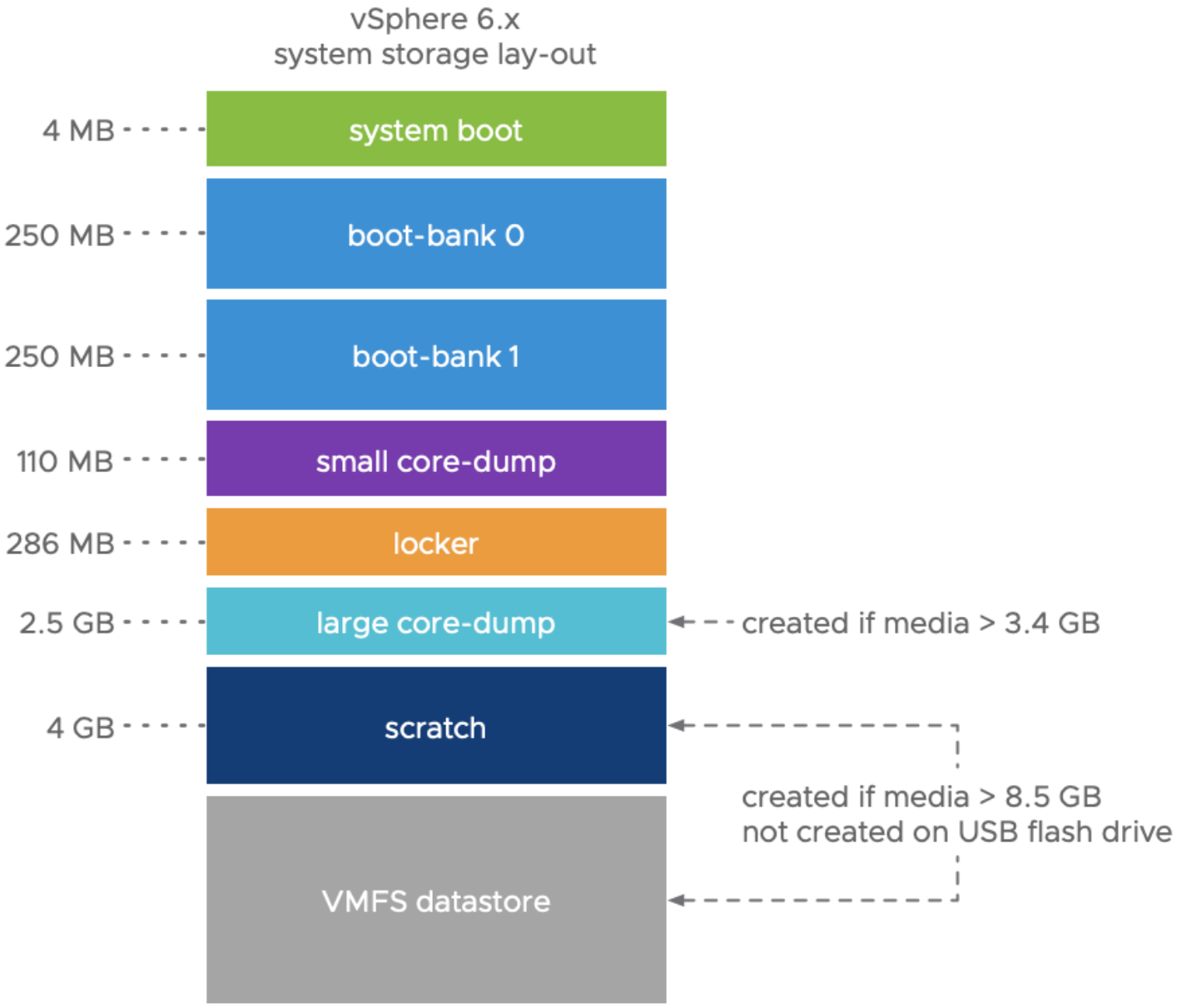
Overview

We’ve reviewed and changed the lay-out for ESXi system storage partitions on its boot device. This is done to be more flexible, and to support other VMware, and 3rd party solutions. Prior to vSphere 7, the ESXi system storage lay-out had several limitations. The partition sizes were fixed and the partition numbers were static, limiting partition management. This effectively restricts the support for large modules, debugging functionality and possible third-party components.

That is why we changed the ESXi system storage partition layout. We have increased the boot bank sizes, and consolidated the system partitions and made them expandable. This article details these changes introduced with vSphere 7 and how that reflects on the boot media requirements to run vSphere 7. We've collected some of the most common questions around this topic in this ESXi System Storage FAQ resource.

ESXi System Storage Changes

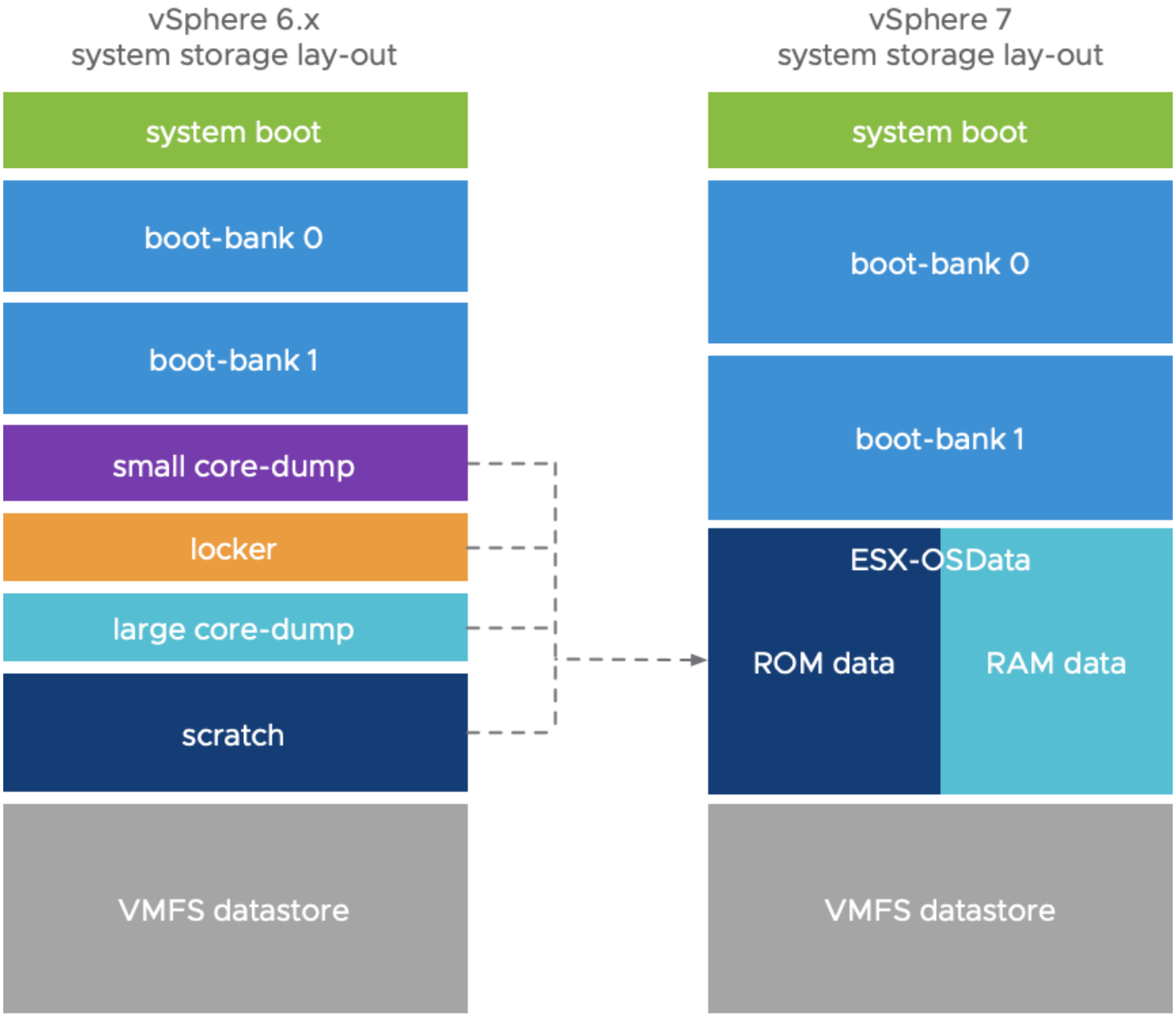
Partition Lay-out in vSphere 6.x



The partition sizes in vSphere 6.x are fixed, with an exception for the scratch partition and the optional VMFS datastore. These are created depending on the used boot media and its capacity.

Consolidated Partition Lay-out in vSphere 7

To overcome the challenges presented by using this configuration, the boot partitions in vSphere 7 are consolidated.



The ESXi 7 System Storage lay-out only consists of four partitions.

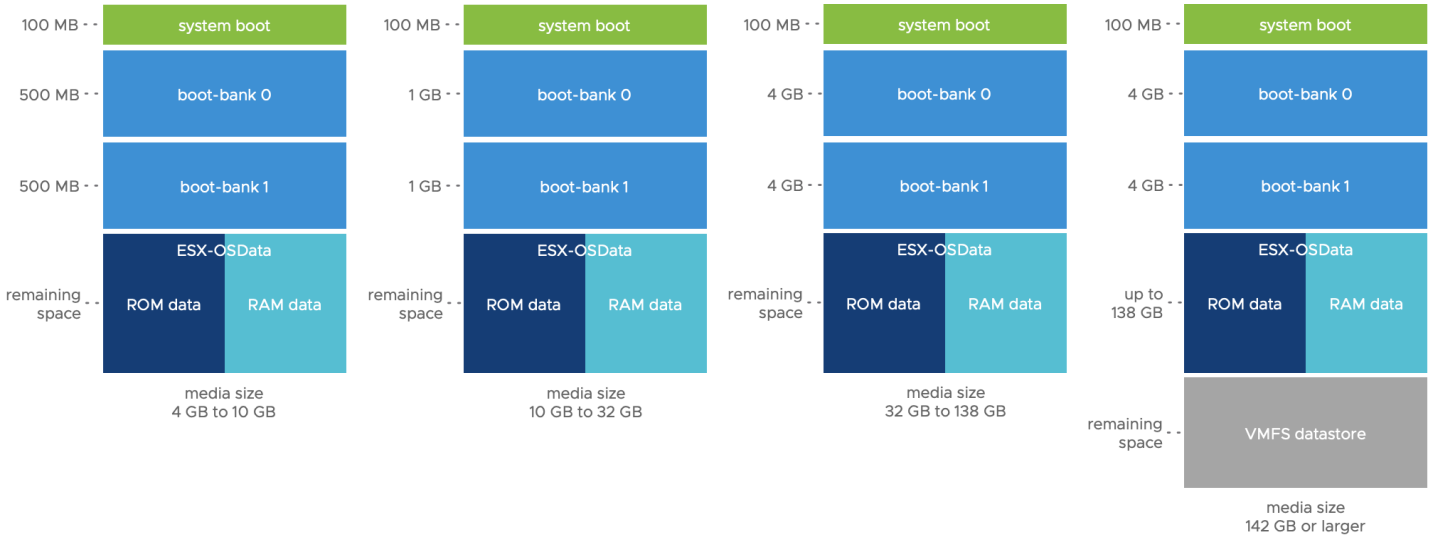
- System boot
  - Stores boot loader and EFI modules.
  - Type: FAT16
- Boot-banks (x2)
  - System space to store ESXi boot modules
  - Type: FAT16
- ESX-OSData
  - Acts as the unified location to store extra (nonboot) modules, system configuration and state, and system virtual machines
  - Type: VMFS-L
  - Should be created on high-endurance storage devices

The OSData partition is divided into two high-level categories of data called ROM-data and RAM-data. Frequently written data, for example, logs, VMFS global traces, vSAN EPD and traces, and live databases are referred to as RAM-data. ROM-data is data written

infrequently, for example, VMtools ISOs, configurations, and core dumps.

ESXi 7 System Storage Sizes

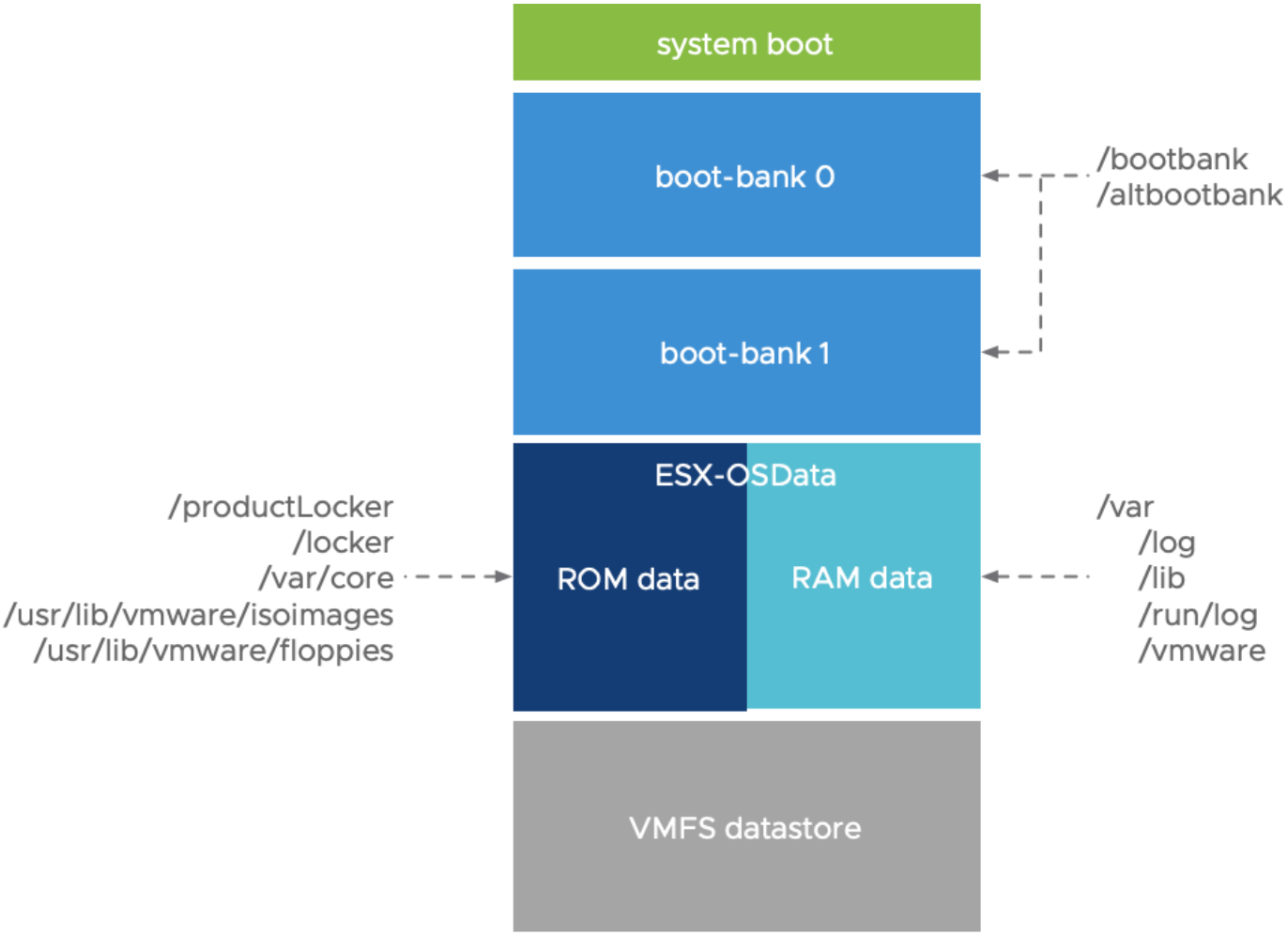
Depending the boot media used and if its a fresh installation or upgrade, the capacity used for each partition varies. The only constant here is the system boot partition. If the boot media is 142GB or larger, a VMFS datastore, of minimum size 4 GB, is created automatically to use for storing virtual machine data.



For storage media such as USB or SD devices, the ESX-OSData partition is created on a high-endurance storage device such as an HDD or SSD. When a secondary high-endurance storage device is not available, VMFS-L Locker partition is created on USB or SD devices, but this partition is used only to store ROM-data. RAM-data is stored on a RAM disk.

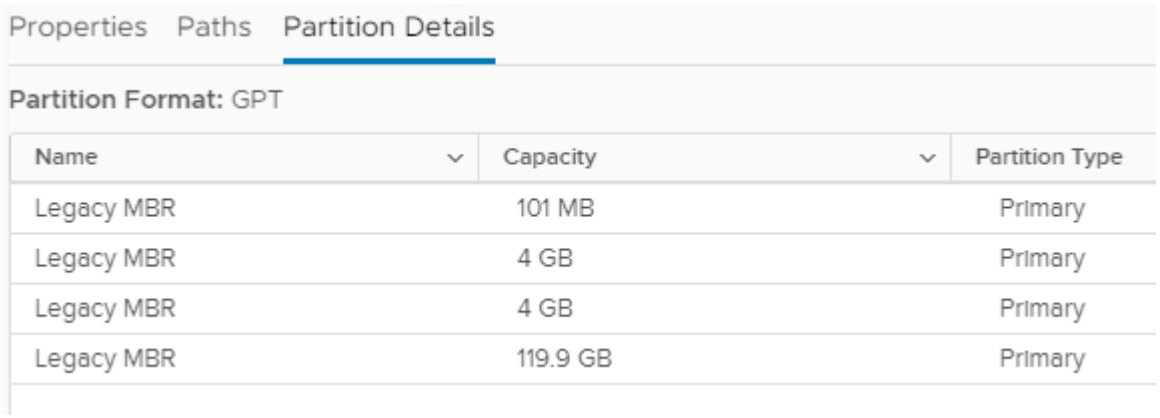
ESXi 7 System Storage Contents

The sub-systems that require access to the ESXi partitions, access these partitions using the symbolic links. For example: */bootbank* and */altbootbank* symbolic links are used for accessing the active bootbank and alternative bootbank. The */var/core* symbolic link is used to access the core-dumps.



Review the System Storage Lay-out

When examining the partition details in the vSphere Client, you'll notice the partition lay-out as described in the previous chapters. Use this information to review your boot media capacity and the automatic sizing as configured by the ESXi installer.



A similar view can be found in the CLI of an ESXi host. You'll notice the partitions being labeled as BOOTBANK1/2 and OSDATA.

```
Filesystem   Size   Used Available Use% Mounted on
NFS41        2.0T 246.2G      1.7T  12% /vmfs/volumes/CPBU_TKT2169456_2TB_02
NFS41        2.0T 149.2G      1.8T   7% /vmfs/volumes/CPBU_TKT2169456_2TB_01
VFFS       119.8G   6.5G    113.3G   5% /vmfs/volumes/OSDATA-5e90f105-4b5548a8-b6ab-246e96b3e2b4
vfat         4.0G 162.8M      3.8G   4% /vmfs/volumes/BOOTBANK1
vfat         4.0G 162.9M      3.8G   4% /vmfs/volumes/BOOTBANK2
vsan         7.0T 611.6G      6.4T   9% /vmfs/volumes/vsanDatastore
```

You might notice the OSDATA partition being formatted as the Virtual Flash File System (VFFS). When the OSDATA partition is placed on a SDD or NVMe device, VMFS-L is labeled as VFSS.

Boot Media

vSphere supports a wide variety of boot media with a strong recommendation to use high-endurance storage media devices like HDD, SSD and NVMe, or boot from a SAN LUN. To install ESXi 7, these are the recommendations for choosing boot media:

- 32GB for other boot devices like hard disks, or flash media like SSD or NVMe devices.
- A boot device must not be shared between ESXi hosts.

Upgrading to from ESXi 6.x to ESXi 7.0 requires a boot device that is a minimum of 4 GB. Review the full vSphere ESXi hardware requirements here. As always, the VMware Compatibility Guide is the source of truth for supported hardware devices.

Legacy SD and USB devices are supported with some limitations listed below, more information in this FAQ.

- To chose a proper SD or USB boot device, see Knowledge Base article 82515.You must provide an additional VMFS volume of at least 32 GB to store the ESX-OSData volume and required VMFS datastore. If the boot device is 142GB or larger, the ESXi installer creates a VMFS volume automatically. Delete the VMFS datastore on USB and SD devices immediately after installation to prevent data corruption. For more information how to configure a persistent scratch partition, see Knowledge Base article 1033696.
- If the VMware Tools partition is stored locally, you must redirect it to the RAM disk. For more information, see Knowledge Base article 83376.
- You must use an SD flash device that is approved by the server vendor for the particular server model on which you want to install ESXi on an SD flash storage device. You can find a list of validated devices on partnerweb.vmware.com.

Other Resources to Learn

Important Links

The following resources contain more information around the ESXi system storage topic:

- ESXi System Storage Changes
- ESXi System Storage While Upgrading
- ESXi System Storage FAQs
- ESXi 7 Storage Requirements
- ESXi 7 System Storage warnings – VMware KB Article 85615
- VMFS-L locker partition corruption
- Bootbank cannot be found at path '/bootbank' errors being seen after upgrading to ESXi 7.0 U2
- Creating a persistent scratch location for ESXi 7.x/6.x/5.x/4.x
- Configure ESXi Dump Collector with ESXCLI
- Removal of SD card/USB as a standalone boot device option (KB Article 85685)