



**Hewlett Packard
Enterprise**

Custom OS and data disk configurations

HPE 3PAR StoreServ File Controller v3 System

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Overview

This document describes how to create a custom OS disk configuration using a USB flash drive or thumb drive, and a custom-crafted configuration file that is used during the system recovery process. The information applies to Generation 9 (G9) of the HPE 3PAR StoreServ File Controller v3 System running system software version 3.02.0a or above.

The document presents example configuration files for OS disk and example commands for data disks. Custom disk configurations are useful in a variety of situations, such as:

- Deployment of multiple systems with identical configurations
- Satisfying a need that the default configuration does not meet
- Preconfiguring the storage to satisfy process requirements

Note

It is not necessary to use these instructions when restoring a system to the factory configuration.

Intended audience

While this document can be used by anyone who wants to create a custom disk configuration on their HPE 3PAR StoreServ File Controller v3 systems, it applies primarily to system administrators and other personnel who are responsible for maintenance or initial configuration of storage systems.

Platforms supported by this document

HPE 3PAR StoreServ File Controller v3 Single Node

HPE 3PAR StoreServ File Controller v3 System

Custom OS disk configuration

The OS disk configuration feature enables the creation of a custom disk configuration schema. The disks that can be included in the schema must be attached to the HPE Smart Array controller that is shipped with the unit. At this time, it is not possible to include other controllers or their attached disks in the schema.

Limitations on RAID levels, logical disk sizes, stripe size, hot spares, and so forth are dictated by the capabilities of the disks and more importantly, the Smart Array controller. For example, some Smart Array controllers only enable RAID 6 if a license key has been used to enable it.

Do not mix drive types when developing your custom OS disk configuration, in other words all drives need to be the same type of drive. For instance, SSD drives cannot be mixed with SAS drives.

This feature is useful only when using the HPE System Restore DVD (version 2.x, 3.x, and higher releases) included with the system or downloaded from the HPE website. You cannot configure SAN storage using this feature.

Configuration file syntax

It is important to understand the configuration file syntax before looking at example configurations. The configuration file is a standard XML file. The top level is a node named **Configurations**. This example is the operating system logical drive. More detail is given in the individual sections.

```
<Configurations>
  <Configuration Id="Custom">
    <Array Id="A">
      <LogicalDrive>1</LogicalDrive>
    </Array>
    <LogicalDrive Id="1">
      <RAIDLevel>5</RAIDLevel>
      <SizeGB>40</SizeGB>
      <Mandatory>1</Mandatory>
      <HotSpareDriveBay>4</HotSpareDriveBay>
      <PhysicalDriveBay>0</PhysicalDriveBay>
      <PhysicalDriveBay>1</PhysicalDriveBay>
      <PhysicalDriveBay>2</PhysicalDriveBay>
      <PhysicalDriveBay>3</PhysicalDriveBay>
      <Partition Id="1">
        <SizeMB>300</SizeMB>
        <Align>0</Align>
        <FileSystem>NTFS</FileSystem>
        <Letter>S</Letter>
        <Label>System Reserved</Label>
        <PartitionType>MBR</PartitionType>
      </Partition>
      <Partition Id="2">
        <SizeMB>Max</SizeMB>
        <Align>0</Align>
        <FileSystem>NTFS</FileSystem>
        <Letter>C</Letter>
        <Label>System</Label>
        <PartitionType>MBR</PartitionType>
      </Partition>
    </LogicalDrive>
  </Configuration>
</Configurations>
```

```
</LogicalDrive>  
</Configuration>  
</Configurations>
```

Set the `Id` attribute to **Custom**.

The array nodes contain the logical drive callouts for the logical drives that will be in this array. The array in this example hosts one logical drive with an `Id` attribute of **1**.

Each logical drive node contains specific configuration information for each logical drive.

The `Logical Drive Id` attribute is used in the array declaration. This logical drive's `Id` attribute is **1**.

The `RAIDLevel` value of **5** enables creation of a RAID 5 logical disk.

The **Size** value of **40** enables creation of a 40 GB logical drive.

The logical disk will be created on the first four physical drives.

The **Mandatory** value of **1** means that if the logical disk is not created, the system generates an error.

In this example, the first partition consumes 300 MB of disk space. It will be formatted with NTFS and will be given the drive letter `S` and the label **System Reserved**. This partition **must** be labeled `System Reserved`. The second partition consumes the remaining disk space and is used for the operating system. It **must** be labeled **System**.

Configuration

The configuration node contains various sub-nodes that describe the disk configuration.

Array ID

It is possible to have more than one array per system. The number of arrays is limited to the number of physical disks attached to the array controller. In practice, there are typically less than five arrays in a system. The content of the array node is a list of one or more logical disks that are contained by the array. Each array is composed of the physical disks that are defined in the logical drive node, and each logical drive that is specified in the array node must include the same physical disks. The operating system logical disk must reside on **Array A**. The `Id` attribute must start with **A** and continue through **Z** with no gaps in numbering.

Logical drive ID

The logical drive identifies logical drive for the array ID configuration specified. There can be one or more logical drive per array. The `Id` attribute must be unique and increase in a consistent numerical pattern starting at **1** for each logical drive. In other words, the first logical drive would use an `Id` attribute of **1** and the second would use an `Id` attribute of **2**, and so on.

Note

You must apply a consistent numerical pattern even if the logical drives are in different arrays.

RAID level

This specifies the RAID level for the disk configuration. The RAID controller may disallow certain RAID levels. For more information on which RAID levels can and cannot be used, see the RAID controller documentation. The string used as the value for this parameter is used directly by the `HPE SSACLI` utility.

Size

This field specifies the size of the logical drive. The size is specified in gigabytes (GB). If the value is `Max`, then the maximum size logical drive is created. The maximum size is determined using the RAID level and the size of the physical disks.

Mandatory

If the mandatory flag is set to **1** and if the drive is not created successfully, the restore process fails. The only mandatory drive is the logical drive that hosts the operating system. Requirements for additional drives are at the discretion of the user.

PhysicalDriveBay

The PhysicalDriveBay field defines which drives are used in the creation of the logical drive. Each logical drive that is part of a particular array must have the same physical drives specified. For example, if one array has two logical drives defined, both logical drives must include the same PhysicalDriveBay identifier. Physical drives are 0-based. The physical drive in bay 1 is physical drive 0.

HotSpareDriveBay

This optional parameter specifies the drive that will be used as the hot spare drive for the logical drive. Hot spares are not required.

Partition

The partition field contains configuration information about the volume. The only supported partition size is Max, which is indicated by the numerical value **1**, and only one partition can be created per logical drive. The Id attribute must be **1**.

Size

The size of the partition is specified in gigabytes (GB). Typically, Max is specified, which means that the partition consumes the entire logical drive.

Note

Specifying a partition size other than Max is not supported at this time.

Align

The value of the align node specifies the number of kilobytes (KB) from the beginning of the disk to the closest alignment boundary. Typically, this value is 0.

FileSystem

FileSystem specifies the file system type used when formatting the partition. The allowable types are NT File System (NTFS) and FAT32. The operating system logical drive partition must be NTFS.

Letter

The letter parameter specifies the drive letter that will be used for the partition in the operating system. The operating system drive letter must be **C**. Drive letters must be unique.

Label

Partitions are labeled according to the label parameter. The operating system logical drive partition must be labeled **System**.

PartitionType

The partition types that can be specified are Master Boot Record (MBR) or GUID Partition Table (GPT). The operating system partition must be an MBR partition. It is not possible to convert partitions to GPT while data exists in the partition. Partitions that are larger than 2 TB or that may be increased to more than 2 TB must be GPT partitions.

Creating a configuration file

Any text editor can be used to create the configuration file, but using an editor that does syntax highlighting for XML files is the preferred method for creating the configuration file. Open the file using Internet Explorer to check for missing elements such as closing tags. The name of the configuration file must be named **diskconfig.xml**.

Using the configuration file

When the configuration file is complete, do the following:

1. Place the configuration file on a non-bootable USB flash drive in the root directory and name it **diskconfig.xml**.
2. Insert the USB flash drive.
3. Place the HPE System Recovery DVD in the DVD drive, and then reboot the system from the DVD. While the system is starting, the system uses disk configuration file on the flash drive to configure the disks.

Note

You must leave the flash drive in the system the entire time the restore process is running, until the first reboot.

4. After the system reboots, you can remove the flash drive.

Note

If you are using a bootable USB flash drive to restore the system instead of a DVD, place the **diskconfig.xml** file in the root of the USB flash drive.

Note

Custom OS disk configuration may not work, in case of remotely connected HPE Integrated Lights-Out (iLO) virtual DVD or flash device.

Examples

Following are a few examples of real-world customer scenarios.

Example 1: Eight 1 TB disks, 45 GB RAID 5 OS volume, three RAID 5 data drives

The data drives in this example are two equally sized (approximately 2 TB) volumes and a third drive that consumes the remainder of the space.

Configuration file contents

```
<Configurations>
<Configuration Id="Custom">
  <Array Id="A">
    <LogicalDrive>1</LogicalDrive>
    <LogicalDrive>2</LogicalDrive>
    <LogicalDrive>3</LogicalDrive>
    <LogicalDrive>4</LogicalDrive>
  </Array>
  <LogicalDrive Id="1">
    <RAIDLevel>5</RAIDLevel>
    <SizeGB>45</SizeGB>
    <Mandatory>1</Mandatory>
    <PhysicalDriveBay>0</PhysicalDriveBay>
    <PhysicalDriveBay>1</PhysicalDriveBay>
    <PhysicalDriveBay>2</PhysicalDriveBay>
    <PhysicalDriveBay>3</PhysicalDriveBay>
    <PhysicalDriveBay>4</PhysicalDriveBay>
    <PhysicalDriveBay>5</PhysicalDriveBay>
    <PhysicalDriveBay>6</PhysicalDriveBay>
```

```
<PhysicalDriveBay>7</PhysicalDriveBay>
<Partition Id="1">
  <SizeMB>300</SizeMB>
  <Align>0</Align>
  <FileSystem>NTFS</FileSystem>
  <Letter>S</Letter>
  <Label>System Reserved</Label>
  <PartitionType>MBR</PartitionType>
</Partition>
<Partition Id="2">
  <SizeMB>Max</SizeMB>
  <Align>0</Align>
  <FileSystem>NTFS</FileSystem>
  <Letter>C</Letter>
  <Label>System</Label>
  <PartitionType>MBR</PartitionType>
</Partition>
</LogicalDrive>
<LogicalDrive Id="2">
  <RAIDLevel>5</RAIDLevel>
  <Size>2048</Size>
  <Mandatory>1</Mandatory>
  <PhysicalDriveBay>0</PhysicalDriveBay>
  <PhysicalDriveBay>1</PhysicalDriveBay>
  <PhysicalDriveBay>2</PhysicalDriveBay>
  <PhysicalDriveBay>3</PhysicalDriveBay>
  <PhysicalDriveBay>4</PhysicalDriveBay>
  <PhysicalDriveBay>5</PhysicalDriveBay>
  <PhysicalDriveBay>6</PhysicalDriveBay>
  <PhysicalDriveBay>7</PhysicalDriveBay>
  <Partition Id="1">
    <Size>Max</Size>
```

```
<Align>0</Align>
<FileSystem>NTFS</FileSystem>
<Letter>D</Letter>
<Label>Data_1</Label>
<PartitionType>MBR</PartitionType>
</Partition>
</LogicalDrive>
<LogicalDrive Id="3">
  <RAIDLevel>5</RAIDLevel>
  <Size>2048</Size>
  <Mandatory>1</Mandatory>
  <PhysicalDriveBay>0</PhysicalDriveBay>
  <PhysicalDriveBay>1</PhysicalDriveBay>
  <PhysicalDriveBay>2</PhysicalDriveBay>
  <PhysicalDriveBay>3</PhysicalDriveBay>
  <PhysicalDriveBay>4</PhysicalDriveBay>
  <PhysicalDriveBay>5</PhysicalDriveBay>
  <PhysicalDriveBay>6</PhysicalDriveBay>
  <PhysicalDriveBay>7</PhysicalDriveBay>
  <Partition Id="1">
    <Size>Max</Size>
    <Align>0</Align>
    <FileSystem>NTFS</FileSystem>
    <Letter>E</Letter>
    <Label>Data_2</Label>
    <PartitionType>MBR</PartitionType>
  </Partition>
</LogicalDrive>
<LogicalDrive Id="4">
  <RAIDLevel>5</RAIDLevel>
  <Size>Max</Size>
  <Mandatory>1</Mandatory>
```



```
<PhysicalDriveBay>0</PhysicalDriveBay>
<PhysicalDriveBay>1</PhysicalDriveBay>
<PhysicalDriveBay>2</PhysicalDriveBay>
<PhysicalDriveBay>3</PhysicalDriveBay>
<PhysicalDriveBay>4</PhysicalDriveBay>
<PhysicalDriveBay>5</PhysicalDriveBay>
<PhysicalDriveBay>6</PhysicalDriveBay>
<PhysicalDriveBay>7</PhysicalDriveBay>
<Partition Id="1">
  <Size>Max</Size>
  <Align>0</Align>
  <FileSystem>NTFS</FileSystem>
  <Letter>F</Letter>
  <Label>Data_3</Label>
  <PartitionType>MBR</PartitionType>
</Partition>
</LogicalDrive>
  <Configuration>
</Configurations>
```

Example 2: 12 1 TB disks, 40 GB RAID 5 OS volume on five disks, one data drive on six disks, one spare

This configuration defines two arrays:

- One for the operating system
- One for the data drive

Note

The second `LogicalDrive Id` is different from the first `LogicalDrive Id`. Since the data drive is only 2 TB, there is approximately 3 TB of unused space in array B.

Configuration file contents

```
<Configurations>
<Configuration Id="Custom">
  <Array Id="A">
    <LogicalDrive>1</LogicalDrive>
  </Array>
  <Array Id="B">
    <LogicalDrive>2</LogicalDrive>
  </Array>
<LogicalDrive Id="1">
  <RAIDLevel>5</RAIDLevel>
  <SizeGB>40</SizeGB>
  <Mandatory>1</Mandatory>
  <PhysicalDriveBay>0</PhysicalDriveBay>
  <PhysicalDriveBay>1</PhysicalDriveBay>
  <PhysicalDriveBay>2</PhysicalDriveBay>
  <PhysicalDriveBay>3</PhysicalDriveBay>
  <PhysicalDriveBay>4</PhysicalDriveBay>
  <Partition Id="1">
    <SizeMB>300</SizeMB>
    <Align>0</Align>
    <FileSystem>NTFS</FileSystem>
    <Letter>S</Letter>
    <Label>System Reserved</Label>
    <PartitionType>MBR</PartitionType>
  </Partition>
  <Partition Id="2">
    <SizeMB>Max</SizeMB>
    <Align>0</Align>
    <FileSystem>NTFS</FileSystem>
    <Letter>C</Letter>
    <Label>System</Label>
    <PartitionType>MBR</PartitionType>
```

```
</Partition>
</LogicalDrive>
<LogicalDrive Id="2">
  <RAIDLevel>5</RAIDLevel>
  <Size>2048</Size>
  <Mandatory>1</Mandatory>
  <PhysicalDriveBay>5</PhysicalDriveBay>
  <PhysicalDriveBay>6</PhysicalDriveBay>
  <PhysicalDriveBay>7</PhysicalDriveBay>
  <PhysicalDriveBay>8</PhysicalDriveBay>
  <PhysicalDriveBay>9</PhysicalDriveBay>
  <PhysicalDriveBay>10</PhysicalDriveBay>
  <HotSpareDriveBay>11</HotSpareDriveBay>
  <Partition Id="1">
    <Size>Max</Size>
    <Align>0</Align>
    <FileSystem>NTFS</FileSystem>
    <Letter>D</Letter>
    <Label>Data</Label>
    <PartitionType>MBR</PartitionType>
  </Partition>
</LogicalDrive>
<Configuration>
</Configurations>
```

For more information

For HPE 3PAR StoreServ File Controller v3 System user guide and administrator guide, go to **Technical Support/Manuals** section at: hpe.com/storage/3parfilecontroller

[Storage Cmdlets in Windows® PowerShell](#)

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