



**Hewlett Packard**  
Enterprise

# **NimbleOS 5.1.3.100 Release Notes**

Version 5.1.3.100

Published February, 2020

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## Support

All documentation and knowledge base articles are available on HPE InfoSight at <https://infosight.hpe.com>. To register for HPE InfoSight, click the *Create Account* link on the main page.

Email: [support@nimblestorage.com](mailto:support@nimblestorage.com)

For all other general support contact information, go to <https://www.nimblestorage.com/customer-support/>.

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# NimbleOS 5.1.3.100

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<b>Version:</b>	5.1.3.100
<b>Revision:</b>	Tuesday February 25, 2020 17:48:17

The release notes describe the major changes, fixes, and known issues for this release of the NimbleOS. They do not include all individual fixes and internal changes.

For technical support, contact HPE Nimble Storage Support at:

<mailto:support@nimblestorage.com>

877-3-NIMBLE (877-364-6253), option 2.

## Important Update Note

Updating NimbleOS can involve an update to component firmware on the standby controller. This can cause an email alert and automated case indicating "Standby Controller Not Available" when the firmware update process takes longer than five minutes. This is expected behavior and does not affect data services. At the end of the software update, you can check status of both controllers in the Web UI under **Manage > Hardware**. One controller will be ACTIVE and the other STANDBY under normal operating conditions following a successful software update.

All third-party software notices can be found on HPE InfoSight (<https://infosight.hpe.com>) on the **Resources > Documentation** page:

<https://infosight.hpe.com/resources/nimble/docs>

The Documentation page also includes the *General Terms and Conditions* document. You can display this document by performing the following steps:

- 1 In the navigation pane on the HPE InfoSight Documentation page, scroll through the Document Type list and select Support Policy.
- 2 In the page that appears, select General Terms and Conditions. This document opens in a browser tab.

## Special Notes

Note	Description
<b>CRITICAL</b>	HPE Nimble Storage continues to qualify configurations between releases. The Validated Configuration Matrix provides information about validated configurations and is updated frequently. It is a good practice to check your system configuration against this online tool. The Validated Configuration Matrix tool is available on HPE InfoSight:  <a href="https://infosight.hpe.com/resources/nimble/validated-configuration-matrix">https://infosight.hpe.com/resources/nimble/validated-configuration-matrix</a>
<b>CRITICAL</b>	Arrays must be running NimbleOS 4.5.4.0 or 5.0.4.0 or later to upgrade to NimbleOS 5.1.3.100.
<b>CRITICAL</b>	Internet Explorer 10 and earlier versions are not supported in NimbleOS 4.x and later.

Note	Description
<b>CRITICAL</b>	<p>An extended data services outage may occur with MS iSCSI initiator and Intel NICs using the built-in Windows driver e1q60x64.sys (version 11.0.5.21/11.0.5.22).</p> <p>If you encounter this problem, please update your system to use the latest Windows driver.</p>
<b>CRITICAL</b>	<p>A service outage may occur on Windows 2012 R2 hosts using Emulex or Broadcom Fibre Channel HBAs with firmware/driver prior to 11.2. Update the Emulex or Broadcom firmware/driver to 11.2 or later</p>
<b>CRITICAL</b>	<p>Due to a known Red Hat Enterprise Linux bug 1002727, while running virtualized in VMware ESX, manually rebooting the active controller in presence of heavy IOs using the <b>reboot --controller</b> command on a Fibre Channel array may trigger an incorrect retry initiated by RHEL guests running the following kernel versions:</p> <ul style="list-style-type: none"> <li>• 6.4 and earlier</li> <li>• 6.5 without the patch</li> <li>• 7.0 without the patch</li> </ul> <p>This incorrect retry logic may lead to unexpected application behavior. In these environments, we recommend the <b>failover</b> command instead.</p>
<b>CRITICAL</b>	<p>Due to a known Red Hat Enterprise Linux bug 3550561, unexpected application behavior may occur on RHEL 7.5 hosts with kernel-3.10.0-862.3.2.el7 or derivatives using Emulex FC FCoE HBAs (lpfc driver) and raw devices. To avoid this issue:</p> <ul style="list-style-type: none"> <li>• If running RHEL 7.6, update to kernel-3.10.0-957.el7 or later.</li> <li>• If running RHEL 7.5z, update to kernel-3.10.0-862.25.3.el7 or later.</li> </ul>
<b>CRITICAL</b>	<p>As outlined in the current Validated Configuration Matrix, HPE Nimble Storage fully supports Windows guest operating systems on Microsoft Hyper-V, including Virtual Fibre Channel (VFC) connectivity and multi-pathing with HPE Nimble Storage DSM and VSS support. However, Linux guest operating systems running in Hyper-V VFC configurations are not qualified. Running Red Hat Linux guest operating systems with the "Linux Integration Services" kit installed, or with hv_storvsc drivers in such configurations can lead to Red Hat bug 1364282, which can cause an unexpected service outage.</p>
<b>Important</b>	<p>Starting with NimbleOS 5.1.1.0, the size of the software package now exceeds 2 GB, which may lead to lengthier software download times. Previously, the sizes of the NimbleOS 5.0.x download packages were approximately 1.6 GB, and NimbleOS 4.x packages were approximately 900 MB.</p>
<b>Important</b>	<p>HPE Nimble Storage CS2xx (except CS235) and CS4xx arrays are blocked from updating to NimbleOS 5.1.1.0 and later releases by default. These arrays will be allowed to update in special circumstances, such as for group merge and evacuation purposes, and temporary data migration workloads. Contact HPE Nimble Storage Support if you wish to update your CS2xx or CS4xx array to NimbleOS 5.1.x.x.</p>

Note	Description																						
<b>Important</b>	After completing the NimbleOS update for array groups configured for Synchronous Replication, download the corresponding version of the <a href="#">Synchronous Replication Witness</a> software, and update the witness host.																						
<b>Important</b>	Microsoft Offload Data Transfer (ODX) is not supported if the destination volume has synchronous replication enabled.																						
<b>Important</b>	Starting with NimbleOS version 5.0.7.0, the Fibre Channel HBAs will use an updated firmware (11.4.204). The new firmware addresses an issue in which some 16Gb Fibre Channel HBAs might not auto-negotiate to 16Gb on all ports due to a timing issue within the code of the previous version of the firmware.																						
<b>Important</b>	As of vSphere 6.5, VMware is discontinuing the Thick Client (also known as the desktop or C# Client). As a result, the HPE Nimble Storage vCenter Plugin is deprecating the Thick Client and future releases of NimbleOS will not support it.																						
<b>Important</b>	<p>Starting with version 5.0.3.0, NimbleOS includes a restriction that prevents you from enabling deduplication when you are using a CS3000, CS5000, CS7000, HF20, HF40, or HF60 array that has fewer than six SSDs. This restriction is necessary to prevent the possibility of significant performance issues.</p> <p>Because NimbleOS 5.0.2.0 and 5.0.1.0 did not enforce this restriction, arrays upgrading from those releases may already have volumes with deduplication enabled. Any array upgrading to 5.0.3.0 or later with deduplicated volumes will continue to operate as a dedupe capable array, regardless of the number of installed SSDs. Such configurations are <i>not</i> recommended by HPE Nimble Storage.</p> <p>The following table lists the number of SSDs required for the different arrays:</p> <table border="1"> <thead> <tr> <th>Array Model</th> <th>Required Number of SSDs</th> </tr> </thead> <tbody> <tr> <td>HF20H</td> <td>2 SSDs</td> </tr> <tr> <td>HF20H upgraded to full population</td> <td>4 SSDs</td> </tr> <tr> <td>HF20H fully populated and upgraded to HF40H</td> <td>4 SSDs</td> </tr> <tr> <td>HF20, HF40, HF60</td> <td>6 SSDs</td> </tr> <tr> <td>CS500</td> <td>4 SSDs</td> </tr> <tr> <td>CS700</td> <td>4 SSDs</td> </tr> <tr> <td>CS1000</td> <td>3 SSDs</td> </tr> <tr> <td>CS3000</td> <td>6 SSDs</td> </tr> <tr> <td>CS5000</td> <td>6 SSDs</td> </tr> <tr> <td>CS7000</td> <td>6 SSDs</td> </tr> </tbody> </table>	Array Model	Required Number of SSDs	HF20H	2 SSDs	HF20H upgraded to full population	4 SSDs	HF20H fully populated and upgraded to HF40H	4 SSDs	HF20, HF40, HF60	6 SSDs	CS500	4 SSDs	CS700	4 SSDs	CS1000	3 SSDs	CS3000	6 SSDs	CS5000	6 SSDs	CS7000	6 SSDs
Array Model	Required Number of SSDs																						
HF20H	2 SSDs																						
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CS700	4 SSDs																						
CS1000	3 SSDs																						
CS3000	6 SSDs																						
CS5000	6 SSDs																						
CS7000	6 SSDs																						

Note	Description
<p><b>Important</b></p>	<p>You can enable deduplication for CS1000, CS3000, CS5000, CS7000, CS700, and CS500 arrays on a volume only if the corresponding storage pool has a Flash to Disk Ratio (FDR) greater than 4%. To calculate the FDR, obtain the "Total array capacity (MiB)" and "Total array cache capacity (MiB)" values by using the HPE Nimble Storage CLI command <b>pool --info pool_name</b>. This command returns the <b>Pool capacity (MiB)</b>, which is the "Total array capacity (MiB)", and the <b>Pool cache capacity (MiB)</b>, which is the "Total array cache capacity (MiB)".</p> <p>Then perform the following calculation:</p> <p><b>FDR = "Total array cache capacity (MiB)"/"Total array capacity (MiB)" * 100</b></p> <p>If the array has sufficient capability for deduplication, the <b>pool --info</b> command will also show a value for <b>dedupe capacity (MiB)</b>.</p> <p><b>Note</b> On the HF20H, HF20, HF40, and HF60 platforms, <b>pool --info</b> displays "N/A" as the value for <b>dedupe capacity (MiB)</b>. This because you can enable deduplication for the entire array.</p>
<p><b>Important</b></p>	<p>For connections to the NimbleOS GUI, you must have port 5392 open for the Group Management IP address and both diagnostic IP addresses.</p>
<p><b>Important</b></p>	<p>VMware has announced End of General Support for vSphere 5.0, 5.1, and 5.5, which includes vSphere Hypervisor ESXi 5.0, 5.1, and 5.5, and vCenter Server 5.0, 5.1, and 5.5. To maintain your full level of support and subscription from VMware, you should upgrade to a supported version of vSphere. Refer to the VMware Knowledge Base article <a href="#">KB51491</a>.</p>
<p><b>Important</b></p>	<p>During deployment of a desktop using VMware Horizon View, a VVol (mapping to a disposable disk) is created. A clone of this VVol is also created and placed within a directory under the virtual machine directory named <code>sdd</code>.</p> <p>When this desktop is deleted from Horizon View, VMware fails to delete the VVol clone of the disposable disk; only the disposable disk itself is deleted. This will be fixed in the next vSphere release. VMware bug number 1807857 should be used to track this fix.</p> <p>This issue occurs on all versions of VMware Horizon and vSphere that support VVols:</p> <ul style="list-style-type: none"> <li>• Horizon 6 version 6.1 and later</li> <li>• vSphere 6.0 and later</li> </ul>
<p><b>Important</b></p>	<p>On Windows Server 2012, 2012 R2, 2016, and 2019, the disk optimization process may record the following error in the Application event log: "The volume was not optimized because an error was encountered: Neither Slab Consolidation nor Slab Analysis will run if slabs are less than 8 MB. (0x8900002D)". Although Windows records this as an Error in the event log, the event can be safely ignored for HPE Nimble Storage volumes. HPE Nimble Storage volumes do not benefit from or require slab consolidation.</p>

Note	Description
<b>Important</b>	<p>Numerous host integration toolkits are supported in NimbleOS 5.1.3.100. It is strongly recommended that they be installed on all Windows, Linux, and VMware hosts. For more information about supported toolkits, refer to the Validated Configuration Matrix, which is available on HPE Nimble Storage InfoSight:</p> <p><a href="https://infosight.hpe.com/resources/nimble/validated-configuration-matrix">https://infosight.hpe.com/resources/nimble/validated-configuration-matrix</a></p>
<b>Important</b>	<p>Hosts leveraging VSS integration with HPE Nimble Storage Windows Toolkit (NWT) 2.1 and earlier will not work with NimbleOS 3.x. and later.</p>
<b>Important</b>	<p>TRIM on ReFS is not supported by Microsoft on Windows Server versions prior to 2019.</p>
<b>Important</b>	<p>HPE Nimble Storage Connection Manager (NCM) for VMware 5.1.0 is signed by VMware for ESXi 5.x and ESXi 6.x. It can be installed through the VMware Update Manager or esxcli command without the <code>--no-sig-check</code> flag.</p> <p>See NCM for VMware Release Notes 5.1.0 or later and the latest <i>VMware Integration Guide</i> for further details. To locate the latest version of the guide, log in to HPE InfoSight. Choose <b>Resources &gt; Nimble Storage Documentation</b>. In the left pane, click <b>Integration Guide</b>, then click <b>Connection Manager (NCM) for VMware</b>. From the list displayed, choose the version of the guide that you want.</p>
<b>Important</b>	<p>Performing a group merge from a source group that contains running Hyper-V virtual machines requires additional care. Group merges require changes to the discovery IP address that can adversely impact running systems. Therefore, if you perform a group merge, you should plan a maintenance outage to gracefully stop all applications and Hyper-V virtual machines on the source group to eliminate unexpected downtime caused by changing IP address during the group merge process. A typical group merge should take only a few minutes to complete and then virtual machines and applications can be restarted.</p> <p>The group merge and pool merge operations will also have impact on SCVMM. The impact will depend on whether the source and destination groups or pools are under SCVMM's management.</p> <p>Please refer to the <i>SMI-S Integration Guide</i> which includes details about SCVMM and the impacts in these situations before performing merge operations.</p>



Note	Description
<b>Important</b>	<p>Various timeout values affect HPE Nimble Storage targets from Windows/Linux hosts. Before you update the NimbleOS, install the HPE Nimble Storage Windows Toolkit (NWT) or HPE Nimble Storage Linux Toolkit (NLT) on the host or tune the timeout values. Timeout details for various operating systems can be found on HPE InfoSight under <b>Resources &gt; Documentation</b>. From the <a href="#">HPE Nimble Storage Documentation</a> page, locate the article you want.</p> <p>The following <b>Knowledge Base</b> articles and Integration Guides explain how to configure and verify host timeout settings for the major supported operating systems (OS):</p> <ul style="list-style-type: none"> <li>For Windows, refer to <a href="#">KB-000052: Windows Host Disk Timeout Values</a>.</li> </ul> <p>In the context of Microsoft Windows, the following article should also be considered:</p> <p><a href="#">KB-000246 MPIO Timeout Parameters for MSDSM and NimbleDSM in Windows 2012 R2</a></p> <ul style="list-style-type: none"> <li>For VMware, refer to the <b>Common Tasks and Best Practices &gt; Host Timeout Values</b> section of the <i>VMware Integration Guide</i>.</li> <li>For Linux, refer to <a href="#">KB-000304: Linux Host Disk Timeout Values</a>.</li> </ul>
<b>Important</b>	<p>The Backup Repository performance policy introduced in NimbleOS 4.2 cannot be used when replicating against a downstream array running an older release. Replicated volumes need to be associated at the time of creation with a performance policy that either exists downstream or that can be manually created on the downstream array.</p>

## New Features in 5.1.3.100

No new features are implemented in NimbleOS 5.1.3.100.

## Recent Release Features

The following features were release in NimbleOS 5.1.x:

### Synchronous Replication

This feature provides the ability to synchronously replicate data between two arrays located in separate datacenters. Synchronous replication provides automatic protection against array or site failure.

### Manual Group Leader Failover

This feature supports the ability to move the group leader functionality from one array to another when arrays are grouped. This allows the retirement of the array supporting the group leader functionality.

### Group Scoped iSCSI Target

This feature allows multiple LUNs to be accessed through a single iSCSI target, which reduces the number of connections required when configuring a large number of LUNs.

### Space Reporting Changes

This feature provides simplified space reporting when using data reduction tools, such as compression and deduplication. Arrays will now show logical mapped usage, which more closely aligns with HPE InfoSight and hosts in terms of per-reduction space usage reported at the volume level. Going forward, reserves will only be thin (0%) or thick (100%). Volume quotas become volume limits. Snapshot quotas no longer exist.

### **Folder Level Space Enforcement**

Expanded the functionality for enforcing space usage within individual folders. In addition, NimbleOS actually enforces limits, and introduces the concept of overdraft, which allows a folder to exceed the provisioned limit before the limit is enforced.

### **Multi-protocol (iSCSI/FC) Access to Same Array**

This feature allows both the iSCSI and Fibre Channel protocols to be used simultaneously on a single array or group to access different LUNs.

### **Custom Password Management Policies**

This feature provides improved password policies to enable greater security for user access to the HPE Nimble Storage array.

### **vCenter Plugin HTML5 Client**

This feature improves the vCenter plugin by leveraging HTML5 technology to better interact with VMware vCenter.

### **Deduplication Support for CS1000 Hybrid Arrays**

Deduplication is now available on HPE Nimble Storage CS1000 hybrid arrays.

**Note** Deduplication is not supported on HPE Nimble Storage CS1000H arrays.

There are certain restrictions for using this feature. Before you enable deduplication on hybrid arrays, review the product documentation for complete details.

## Documentation

These Release Notes and other user documentation are available on HPE InfoSight:

<https://infosight.hpe.com/resources/nimble/docs>

You can manually reach the documentation page by logging onto HPE InfoSight and selecting **Resources > Documentation**.

### Document Search Interface

There are several methods you can use to locate the documents you need.

The **Documentation** page provides a search interface that allows you to search for information across all documentation, including support and knowledge base articles, best practice, solution and integration guides, product documentation, and configuration matrices.

To go directly to a document, use the navigation pane on the left side of the **Documentation** page. The navigation pane organizes documents into categories, including:

- Document Type
- Nimble Software and Solutions
- NimbleOS Version
- Integration
- Platform

You can use the page scroll bar to move up and down the navigation pane.

### Third-Party Software Notices

All third-part software notices can be found in the Documentation Portal on HPE InfoSight.

Here are the steps to manually access the third-party software notices.

- 1 Log in to HPE InfoSight (<https://infosight.hpe.com>) .
- 2 From the menu, select Resources Nimble Documentation .
- 3 In the left navigation pane of the Documentation Portal, scroll through the Document Type section and select Support Policy.
- 4 From the list of documents, select General Terms and Conditions. The document opens in a new browser tab.

### Core User Documentation

The following is the core user documentation for NimbleOS:

- *GUI Administration Guide*
- *CLI Administration Guide*
- *SNMP Reference*
- *Command Reference*
- *REST API Reference*

### Workflow Documents

There are also several workflow guides that contain procedures you can perform using either the CLI or the GUI. Each workflow guide covers a specific, frequently performed task related to HPE Nimble Storage products. These tasks also reside in the *GUI Administration Guide* and the *CLI Administration Guide*.

### Hardware

Documentation for all hardware components is available on HPE InfoSight. This documentation includes array and shelf installation quick start guides, installation, upgrade, and replacement guides, and comprehensive hardware guides.

### Host Integration Guides

Host Integration Guides are available from HPE InfoSight. To locate these documents on the HPE InfoSight **Documentation** page, scroll down the page to the navigation pane section called **Integration**. The available guides include the following:

- *Linux Integration Guide*
- *OpenStack Cinder Driver Integration Guide*
- *SMI-S Integration Guide*
- *UCS Director Open Automation Module Integration Guide*
- *VMware Integration Guide*
- *Windows Integration Guide*

**Note** The version numbers of the host integration guides match the version numbers of their companion Integration Toolkit software packages.

### Integration Toolkits

The following Integration Kits include documents that are associated with the toolkit software. You can search for them by entering the HPE Nimble Storage software type and version. The following integration toolkits are supported:

- HPE Nimble Storage Adaptive Flash Cinder Driver for OpenStack
- HPE Nimble Storage AIX ODM
- HPE Nimble Storage Connection Manager (NCM) for Linux
- HPE Nimble Storage Connection Manager (NCM) for VMware
- HPE Nimble Storage Replication Adapter (SRA)
- HPE Nimble Storage UCS Director Open Automation for Cisco UCS Director
- HPE Nimble Storage Windows Toolkit (NWT)

**Note** To download Integration Kit software, go to HPE InfoSight (<https://infosight.hpe.com>) and choose **Resources > Software Downloads**.

## Verified Update Paths

Table 1: From Versions 5.x

From Versions 5.x	
From Version	To Version
5.1.3.0	5.1.3.100
5.1.2.100	5.1.3.100
5.1.2.0	5.1.3.100
5.1.1.0	5.1.3.100
5.0.7.300	5.1.3.100
5.0.7.200	5.1.3.100
5.0.7.100	5.1.3.100

From Versions 5.x	
From Version	To Version
5.0.7.0	5.1.3.100
5.0.6.0	5.1.3.100
5.0.5.200	5.1.3.100
5.0.5.0	5.1.3.100
5.0.4.0	5.1.3.100
5.0.3.100	5.0.7.300
5.0.3.0	5.0.7.300
5.0.2.0	5.0.7.300
5.0.1.100	5.0.7.300
5.0.1.0	5.0.7.300

**Table 2: From Versions 4.x**

From Versions 4.x	
From Version	To Version
4.5.4.0	5.1.3.100
4.5.3.0	5.0.7.300
4.5.2.0	5.0.7.300
4.5.1.0	5.0.7.300
4.5.0.0	5.0.7.300
4.4.1.0	5.0.7.300
4.4.0.0	5.0.7.300
4.3.1.0	5.0.7.300
4.3.0.0	5.0.7.300
4.2.1.0	5.0.7.300
4.2.0.0	5.0.7.300
4.1.0.0	5.0.7.300

**Table 3: From Versions 3.x**

From 3.x Versions	
From Version	To Version
3.9.1.0	5.0.7.300
3.9.0.0	5.0.7.300
3.8.1.0	5.0.7.300
3.8.0.0	5.0.7.300

From 3.x Versions	
From Version	To Version
3.7.0.0	5.0.7.300
3.6.2.0	5.0.7.300
3.6.1.0	5.0.7.300
3.6.0.0	5.0.7.300
3.5.4.0	5.0.7.300
3.5.3.0	5.0.7.300
3.5.2.0	5.0.7.300
3.5.0.0	5.0.7.300
3.4.1.0	5.0.7.300
3.4.0.0	5.0.7.300
3.3.0.0	5.0.7.300
3.2.1.0	5.0.7.300
3.1.0.0	5.0.7.300

**Table 4: From Versions 2.x**

From 2.2.x, 2.3.x Versions		From 2.1.x Versions		From 2.0.x Versions	
From Version	To Version	From Version	To Version	From Version	To Version
2.3.18.0	4.5.4.0	2.1.9.1	2.3.18.0	2.0.8.0	2.1.9.1
2.3.16.0	4.5.4.0	2.1.9.0	2.3.18.0	2.0.7.0	2.1.9.1
2.3.15.0	4.5.4.0	2.1.8.0	2.3.18.0	2.0.6.*	2.1.9.1
2.3.14.0	4.5.4.0	2.1.7.0	2.2.9.0	2.0.5.0	2.1.9.1
2.3.12.*	4.5.4.0	2.1.6.0	2.2.9.0	2.0.4.0	2.1.9.1
2.3.9.*	4.5.4.0	2.1.5.0	2.2.9.0		
2.3.8.0	4.5.4.0	2.1.4.0	2.2.9.0		
2.3.7.0	4.5.4.0	2.1.3.0	2.2.9.0		
2.3.6.0	4.5.4.0	2.1.2.0	2.2.9.0		
2.3.4.0	4.5.4.0	2.1.1.0	2.1.9.1		
2.3.3.0	4.5.4.0	2.1.0.0	2.1.9.1		
2.3.2.1	4.5.4.0				
2.3.2.0	4.5.4.0				
2.3.1.0	4.5.4.0				
2.2.11.0	3.9.1.0				
2.2.10.0	3.9.1.0				
2.2.9.0	3.9.1.0				

From 2.2.x, 2.3.x Versions		From 2.1.x Versions		From 2.0.x Versions	
From Version	To Version	From Version	To Version	From Version	To Version
2.2.7.*	3.9.1.0				
2.2.6.0	3.9.1.0				
2.2.5.*	3.9.1.0				
2.2.3.*	2.2.11.0				
2.2.2.0	2.2.11.0				
2.2.1.0	2.2.11.0				
2.2.0.0	2.2.11.0				

**Table 5: From Versions 1.x**

From 1.4.x Versions		From 1.3, 1.2, 1.1 Versions		From 1.0.x Versions	
From Version	To Version	From Version	To Version	From Version	To Version
1.4.12.0	2.1.9.1	1.3.**	1.4.6.0	1.0.7.*	Contact Support
1.4.11.0	2.1.9.1	1.2.**	1.4.6.0	1.0.6.*	Contact Support
1.4.10.0	2.1.9.1	1.1.**	1.2.2.0		
1.4.9.0	2.1.9.1				
1.4.8.0	2.1.9.1				
1.4.7.0	2.1.9.1				
1.4.**	1.4.12.0				

## Known Critical Issues

Known Critical Issues in NimbleOS version 5.1.3.100					
ID	Component	Title	Description	Workaround	
AS-77607	Data Service	Removing member array from multi-array group may cause IO disruption to scaled VVol environments	Scaled VVol environments with 500 VVol VDI VMs or more than 5000 Nimble VVol volumes may experience IO disruption when removing a member array from group. Symptom of problem would appear as VVol datastores being (inaccessible). Virtual Machine status would also appear as (inaccessible).	When planning to remove a member array from group, schedule a planned maintenance window and place all ESX hosts into maintenance mode to minimize impact to availability. ESX typically resumes connection to VVol datastores, and reconnects to VMs, after a period of 15-30 minutes automatically without a manual intervention.	

Known Critical Issues in NimbleOS version 5.1.3.100				
ID	Component	Title	Description	Workaround
AS-95470	Data Service	Pool merge fails due to too many pending deletes	When attempting to perform a pool merge operation, if there are a large number of volumes that must be striped across the pool, and one of the arrays has a large number of pending deletes, then it is possible for the operation to fail due to the Data Service being overloaded. Symptoms of this behavior are if the pool merge operation hangs for several minutes and returns the following message: The request could not be understood by the server.	Not applicable
AS-95944	Data Service	Unexpected Data Service restart when a host requests data block allocation status for a large offset range on a vVol volume which is highly fragmented.	If a VVol is highly fragmented, the array may experience an unexpected Data Service restart when the host requests data block allocation status for a large offset range on that volume.	Not applicable.
AS-95763	System Management	Group Management Service restarts after Group Leader Failover.	Under rare circumstances, following a Group Leader Failover, the Group Management Service may become unavailable. This may occur when the Configuration Database is marked with completion state and the transaction to update Scale-Out Database fails or times out. This causes a mismatch between the Configuration and Scale-Out Databases.	The Backup Group Leader name will need to be updated in the Scale-Out Database. Please contact HPE Nimble Storage Support.
AS-94737	System Management	No Automatic Failover in the event the host loses all FC connectivity to an array	An Automatic Failover (AFO) of the Group Management Services will not be initiated if all Fibre Channel (FC) interfaces on the Group Leader array fail on both controllers.	A Manual Group Leader Failover will be required to restore Fibre Channel connectivity to the hosts.



Known Critical Issues in NimbleOS version 5.1.3.100				
ID	Component	Title	Description	Workaround
AS-93553	System Management	Automatic Failover of Group Services is not supported for Encrypted Volumes	If encrypted volumes are configured and Automatic Failover happens, encrypted volumes won't come online automatically after the other array takes over Group Management services. The user will need to enter the passphrase on new group leader array in order to bring the encrypted volumes back online.	Reenter passphrase after Automatic Failover.
AS-89701	System Management	Automatic Switchover Service restarts due to thread limitations	The Automatic Switchover Service internally creates and closes threads each time during Automatic Failover (AFO) quorum setup and tear down. This may cause the service to eventually crash after reaching the maximum thread limit. The system recovers automatically when the Automatic Switchover Service restarts.	Not applicable
AS-65615	System Management	Group Management Service must be restarted to unlock additional volume limits after controller upgrade	When performing a controller upgrade to a high-end model, the object limits will still show the lower limits if the Group Management Service is not restarted.	A failover can be initiated in order to restart the Group Management Service. You may also contact HPE Nimble Storage Support to restart the service manually.
AS-95087	System Management	Unexpected controller takeover due to out-of-memory condition	The array runs post-mortem analysis when one of the essential NimbleOS services terminates abnormally. In rare occasions, such analysis may consume enough memory to trip the out-of-memory threshold, at which point, the controller is rebooted in an attempt to restore normal service. HPE Nimble Storage is currently studying ways to run post-mortem analysis with a lower memory footprint impact.	None. The controller reboot is enough to restore the High Availability state.

Known Critical Issues in NimbleOS version 5.1.3.100				
ID	Component	Title	Description	Workaround
AS-100254	System Management	Group Management Service restarts under heavy load	A system management process can restart when the system is under heavy load. The system recovers automatically. The Data service is not affected.	Not applicable
AS-95637	System Management	Passwordless-SSH connection fails between Group Leader and Backup Group Leader	In certain situations, information about the Group Leaders SSH key may be misconfigured. This may lead to failures in passwordless-SSH connections between the Group Leader and Backup Group Leader arrays. When this happens, it may take longer to set up the Backup Group Leader, and in some cases, the group setup will go out-of-sync.	Please contact HPE Nimble Storage Support.
AS-96222	System Management	Global Search Issues within the Array GUI	There are currently issues with global search functionality within the Nimble array GUI. Currently, the Admin User search is not case sensitive. Also, the Volume Collection, Performance Policy, and Chap Account searches do not display filtered results properly.	Not applicable

## Resolved Critical Issues

Resolved Critical Issues in NimbleOS version 5.1.3.100				
ID	Component	Title	Description	Workaround
AS-100836	System Management	Group Management Service may become unavailable after updating array with Active Directory integration to NimbleOS 5.1.3.0	The Group Management Service on an array group may become unavailable after updating an Active Directory-integrated array from NimbleOS 5.1.2.x to NimbleOS 5.1.3.0. This service unavailability may also occur after enabling Active Directory integration on an array post software update to NimbleOS 5.1.3.0. When encountered, the array becomes unmanageable and loses its core protection capabilities such as snapshots and replication.	Please contact HPE Nimble Storage Support.

## Resolved Issues

There are no resolved issues in NimbleOS version 5.1.3.100

## Known Issues

Known Issues in NimbleOS version 5.1.3.100				
ID	Component	Title	Description	Workaround
AS-81863	Data Service	Data Service may restart unexpectedly when RAID is in degraded mode	When RAID is degraded, IO needs to be reconstructed by reading from multiple disks, and an internal buffer may exhaust its allocated resources. In rare cases when multiple disks are degraded, the Data Service may restart unexpectedly.	If RAID is degraded for an extended period and Data Service restarts occur, contact HPE Nimble Storage to assess adjusting allocated buffer resources.

Known Issues in NimbleOS version 5.1.3.100				
ID	Component	Title	Description	Workaround
AS-95461	Data Service	Initial resync of large volumes may delay other volumes transitions from out-of-sync to in-sync.	In certain scenarios, slow resync progression on large volumes using Synchronous Replication may delay the transition of other volumes - that have already finished their resync - from out-of-sync state to the in-sync state. All volumes should eventually reach the in-sync state.	Not applicable
AS-86720	Data Service	Unassigning and reassigning array to a pool within 5 minutes will fail	Assigning an array to a pool immediately after unassigning it from the same pool will fail with the following error - Failed to assign arrays to the pool: A service is not running or is not reachable	Retry operation after a few minutes to reassign array to pool.
AS-90096	Platform	Data Service restarts due to slow IO to one of the disks	In rare instances due to slow IO to one of the disks, the Data Service may hit a timeout and restart unexpectedly. This issue may occur during a NimbleOS software update.	Please contact HPE Nimble Storage Support so the problematic drive can be replaced.
AS-96053	Platform	NDER process may lead to host reconnects	The Nimble Drive Error Recovery (NDER) is activated for drives failing I/O in an attempt to recover the drive. In rare cases, the process surpass the typical SCSI timeout of 60 seconds, causing host I/O inaccessibility.	Not applicable
AS-49747	Platform	Data Service disrupted when standby controller is in a reboot loop	In a rare case, when the standby controller is in a reboot loop, this may disrupt the Data Service. As a result, the array will report several failed SSDs.	Active controller will operate as expected after the faulty standby controller is disabled. (1) Remove the rebooting standby controller from the chassis or contact HPE Nimble Storage Support to remotely power off the rebooting standby controller from the arrays active controller. (2) Then reseal or disk --remove   add the failed SSDs to recover the SSDs.

Known Issues in NimbleOS version 5.1.3.100				
ID	Component	Title	Description	Workaround
AS-55765	Platform	Network storm causes writes to slow down to a point where Data Service restarts due to a health check failure	On lower-end platforms with a lower number of CPU cores, a network storm could keep the kernel busy serving network interrupt requests, and ultimately delay IO requests. This in turn causes IOs to timeout and causes a Data Service restart to recover.	Address the network storm, and then perform a controller failover.
AS-56600	Platform	NVRAM overloaded on high end platforms under heavy stress	In rare cases, heavy load compounded by unaligned workloads on high-end platforms with many CPU cores can cause the NVRAM driver to become overloaded when all cores are busy. The Data Service may restart unexpectedly with a health check error.	Contact HPE Nimble Storage Support.
AS-56942	Platform	Multi-bit Error-Correcting Code (ECC) errors on NVRAM card caused Data Service restart	In rare cases, multi-bit ECC errors on the NVRAM card may cause the Data Service to restart unexpectedly.	Contact HPE Nimble Storage Support.
AS-32895	Platform	Removing an array from a group leaves the array in an unusable state.	Upon removing an array from a group and removing any expansion shelves from that array, the array will need to be re-imaged prior to any array reuse.	Schedule time for a Sales Engineer to field-image the array.
AS-33725	Platform	Unexpected controller takeover due to incorrect state of the SAS HBA	When the SAS HBA detects faulty states, to recover, the array needs to reset the SAS HBA's firmware. The SAS HBA firmware reset can block disk I/Os significantly longer than our HA monitoring timeouts allow. Instead, a controller reboot is triggered immediately if this state is detected, resulting in an unexpected takeover event.	Contact HPE Nimble Storage Support.

Known Issues in NimbleOS version 5.1.3.100				
ID	Component	Title	Description	Workaround
AS-95054	Not applicable	Addition of a server with expired ESXi license fails	When adding a server with an expired ESXi license through the vCenter plugin, you may see an error saying - Failed to submit a task to add server.	A valid ESXi license must be assigned to the server.
AS-86843	SAN	Data Service may hit assert when host sends writes to read-only snapshot and snapshot creation is in progress.	When host sends write requests to read-only snapshots, the writes will fail with SCSI Check Condition with additional status SCSI_ASC_ASCQ_LU_SOFTWARE_WRITE_PROTECTED. But if Volume Manager is creating snapshot at the same time, the Data Service may hit an assert and restart to recover automatically.	Offline the read-only snapshots where the hosts is sending write requests.
AS-94539	SAN	Data Service or SCSI High Availability Service Restart when processing Fibre Channel connections	In NimbleOS, the Data Service and the SCSI High Availability Service use the same logic for processing Fibre Channel connections. Due to a software defect in the Fibre Channel connection termination logic, either of these services may stop unexpectedly with a corefile and restart. The software defect occurs when code-paths related to connection termination are simultaneously processed: - processing a Connection_Loss event from the FC driver, for connection A - performing an implicit logout of connection A, due to receipt of a New_Connection event for a conflicting connection B (between the same host/array ports). The restart of the affected service causes a brief interruption in the arrays ability to service incoming requests.	There is no workaround.

Known Issues in NimbleOS version 5.1.3.100				
ID	Component	Title	Description	Workaround
AS-56019	Security	Group Management restarts while shutting down	While the group management process is shutting down, it may experience a fault that causes a restart attempt.	None required. The process is shutting down.
AS-68651	System Management	Flood of timeouts causing Event Management service restart	We create multiple threads to deliver emails, but we use a non-threadsafe libcurl call to dispatch them. Therefore, the lock needs to be around libcurl call. If there is a misconfigured DNS or SMTP server, the curl call will timeout. If there are greater than 7 emails waiting to be delivered and all are suffering a timeout, we will starve the health checking for more than the 300-second health check timeout causing the Event Management service to restart.	Correct the DNS or SMTP configuration to a valid address by ensuring that a ping to the defined address succeeds.
AS-94673	System Management	Array management service restarted due to race condition.	Under rare circumstances, the Array Management service may restart on member array after a failover occurs. While in the process of setting the role for the member array, a notification is sent from the Group Leader, which can lead to a race condition causing the service restart.	Not applicable
AS-28992	System Management	Array removal might not complete in time	In some cases when there is high load, array removal can take longer than usual and timeout, which leads to an intermediate state where the group leader believes the array still belongs to the group, but the array has been removed.	Re-run array removal to clear the group leader metadata.

Known Issues in NimbleOS version 5.1.3.100				
ID	Component	Title	Description	Workaround
AS-71090	System Management	No Audit Log entry is created if user does not have the privilege to create user	If a user tries to create a new user account, but the user doesn't have the privilege to do so, the user creation will fail. However, an audit log entry is not created.	Not applicable
AS-97005	System Management	Group Management service unavailable during pool merge	In certain situations, the pool merge operation may cause resource contention, resulting in replication operations to fail a health check. This may also cause the Group Management Service and the Nimble array GUI to become temporarily unavailable.	Pause replication until the pool merge successfully completes
AS-55005	System Management	Unexpected Group Management restart due to memory inconsistency	In rare cases, a memory inconsistency causes an unexpected Group Management Daemon (GMD) restart.	Not applicable
AS-96004	System Management	Group Management Service restarts when trying to create key-value (KV) pair metadata	The Group Management Service may restart unexpectedly when attempting to create for key-value (KV) pair metadata for system objects such as Volumes, Snapshots, Snapshot Collections etc. This could happen only when the KV scrubber task (scheduled to run once weekly) is running at the same time the Group Management Service is also trying to create new KV pair metadata.	No workaround.
AS-94683	System Management	Network isolation of the Group Leader and Backup Group Leader array may lead to Automatic Switchover service restarts	In Automatic Switchover environments, in rare instances, network isolation of the Group Leader and Backup Group Leader may cause the service that handles the automatic switchovers to restart unexpectedly.	No workaround is needed. The service recovers on its own.



Known Issues in NimbleOS version 5.1.3.100				
ID	Component	Title	Description	Workaround
AS-95263	System Management	Issuing group --migrate could result with no Group Leader if there is a failure on Backup leader	In rare instances, if the group --migrate command is issued on the Group Leader array and the Backup Group Leaders Automatic Switchover Service happens to restart at the same time (due to different reason), it is possible that the Backup Group Leader wont be able to promote itself as leader.	Restarting the Automatic Switchover service on the Backup Group Leader recovers from this failure. This can be done by issuing a failover on the Backup Group Leader.
AS-95493	System Management	Array Switchover Service restarts due to memory issues	The witness log collection requested through the Array Switchover Service causes the array to exceed memory allocations. If the Array Switchover Service exceeds the memory limits, the service is restarted by Process Management Service as a precaution.	Not applicable. The Array Switchover Service recovers after the restart.
AS-95345	System Management	Failed to obtain NIC port information. Array was not found.	If there are a large number of arrays within the same network (75+) array discovery may fail with the following error: Failed to obtain NIC port information. Array was not found.	Reduce the number of arrays within the network size or attempt to setup the array at a later time.
AS-74242	System Management	Force deletion of user defined performance policy should not be supported	There is a --force switch available when deleting a performance policy via the HPE Nimble Storage Array CLI. This --force switch does not work and will fail with the following error: ERROR: Failed to delete performance policy. Resource busy. The --force command is not supported since the specified performance policy should not be removed without first checking its volume or folder associations.	Not applicable

Known Issues in NimbleOS version 5.1.3.100				
ID	Component	Title	Description	Workaround
AS-95429	System Management	Error No message received after issuing CLI command	Under system busy conditions, when an excessive amount of operations are being issued in parallel or too many internal retries are occurring to perform tasks, you may receive a No message received error after issuing a CLI command.	Please reissue the command. If the operation was already performed by the earlier command, an appropriate message will be returned.
AS-89124	System Management	Synchronous Replication Volume Count Limit	The group --list_limits CLI command does not list the Synchronous Replication volume count Limit. Synchronous Replication on 5.1.0.0 and later can protect up to 128 volumes.	Not applicable
AS-28589	System Management	Network issues may cause restart of Group Management service	On rare occasions, a very slow network (or network issues like dropped packets) can cause a restart of the Group Management services. However, replication and other services will continue from where they left off prior to the restart.	Not applicable
AS-44941	System Management	Adding/removing volumes while replication is in progress may cause Group Management restart	Adding or removing volumes to a volume collection while replication is in progress for that volume collection could potentially lead to a restart of the Group Management services. This does not have a significant impact however, since replication (and other services) continue from where they left off before the restart	Not applicable
AS-89950	System Management	Replication partner throttle limit is displayed incorrectly	When running the partner -list command via the array CLI, the output shows a large throttle limit set for the replication partner. This information is inaccurate.	Not applicable

Known Issues in NimbleOS version 5.1.3.100				
ID	Component	Title	Description	Workaround
AS-94429	System Management	Replica volume cannot be deleted	A replica volume cannot be deleted, which is why the delete operation is not available within the HPE Nimble Storage Array GUI.	If a user needs to delete a replica volume, the replica volume must first be claimed (i.e., change ownership to the current group). The CLAIM option is available in the detail page for the replica volume.
AS-23891	System Management	Changing replication partner in a volume collection with multiple schedules reports the following error: The request could not be processed by the server	A volume collection can currently replicate to only one replication partner. In case of multiple schedules in a volume collection, editing single protection schedule to different replication partner violates this constraint.	Set downstream partner on all schedules in the volume collection to none and thereafter change replication partner on desired schedules to the new partner.
AS-93113	System Management	Unmanaged snapshots remain after cleanup is enabled	If clones are created using an unmanaged snapshot, then this unmanaged snapshot will not be deleted even if cleanup is enabled.	Not applicable
AS-99849	System Management	After update to 5.1.x.x, volumes in a folder with a limit are taken offline due to folder limit being exceeded	Upon updating from a pre-5.1.x.x software version to a post-5.1.x.x version, volumes can be taken offline/read-only due to folder limits being enforced post-5.1.x.x and changes to the way that volume usage is reported. There is a conversion that occurs on the limit to help account for this difference in usage; however, it does not account for clone savings. This can cause the limit to not be increased sufficiently to account for the new method of space reporting.	Increase the limit of the folder to be larger than the current mapped usage of the folder and bring the necessary volumes back online. View the Offline Reason of the volume in the GUI or CLI using the following command: <code>vol --list</code> View if a volume is non-writable in the GUI or CLI with this command: <code>vol --info &lt;volume name&gt;   grep non_writable</code> To take volume out of read-only mode from CLI use the following command: <code>vol --edit &lt;volume name&gt; --readonly no</code>

Known Issues in NimbleOS version 5.1.3.100				
ID	Component	Title	Description	Workaround
AS-49590	System Management	Unexpected Group Management restart due to high memory utilization	In rare cases, the standard memory allocator does not reuse freed memory efficiently during heavy workloads. When Group Management Daemon (GMD) utilization becomes too high, GMD may restart to recover.	Not applicable
AS-95212	System Management	HPE Nimble Storage array compatibility issues with MIT Kerberos trust types	When the HPE Nimble Storage array is configured to use Active Directory integration, the array is joined to one specific domain, as a domain member. Under normal circumstances, users in trusted domains will also be able to authenticate to the array. If one or more trusted domains are joined to the forest using an MIT Kerberos type trust relationship, users and groups in any trusted domain (e.g. not the domain the array is joined to) will be unable to authenticate to the array.	Not applicable
AS-86545	System Management	Unable to create dedupe enabled volumes on a new install	After a CSx000 array is installed, it takes one minute for the array to determine its deduplication capability. If a volume is created prior to this, it will not have dedupe enabled even if the array is dedupe capable.	Once the array is able to determine its deduplication capability, all newly created volumes will have dedupe enabled, if specified. In order to enable dedupe on the previously created volumes, you may run the following command via the HPE Nimble Storage Array CLI: vol --edit <vol_name> --dedupe_enabled yes
AS-92157	System Management	NO CLI support for changing the Witness Port	Currently, there is no CLI support for changing the witness port. The nimble-witnessd.service file needs to be edited manually.	Not applicable

Known Issues in NimbleOS version 5.1.3.100				
ID	Component	Title	Description	Workaround
AS-98177	System Management	Setting alarm reminder frequency to the same value from GUI does not change next reminder time	When updating an alarm from the Events > Alarms page in GUI, selecting an alarm and clicking CHANGE REMINDER button, without changing the reminder frequency time, and clicking SAVE button, does not change next reminder time. This behavior is different from CLI. Setting alarm reminder frequency to the same value from CLI resets the next reminder time based on the current time.	To keep the same reminder frequency and reset the next reminder time based on the current time, change the reminder frequency to a different value, save it, and change it back and save it, or use CLI to make the change.
AS-77372	System Management	Group Merge via GUI unable to process large amount of conflicts	Currently within the HPE Nimble Storage Array GUI, when performing a group merge, if there is a large amount of group merge conflicts (1000 or more), the GUI is unable to process and resolve all of them.	To work around this issue: 1. Log into the destination array to resolve the conflicts. 2. Attempt the group merge again.
AS-21697	System Management	GUI shows a general error message during group merge when, for the two groups, the total number of snapshot schedules with a snapshot interval of less than five minutes exceeds five	The GUI shows a general error message during group merge when the total count of snapshot schedules with a snapshot interval of less than five minutes exceeds five: System limits for the number of protection schedules would be violated after adding the array. Current limit is 5.	Delete the appropriate protection schedule with a snapshot interval of less than five minutes to meet the system limits of these protections schedules, and retry the group merge operation.

Known Issues in NimbleOS version 5.1.3.100				
ID	Component	Title	Description	Workaround
AS-95591	System Management	Incorrect ordering of pool merge error messages when Synchronous Replication and Witness are configured	Pool merge is not allowed if Synchronous Replication is enabled and pool merge is not allowed when a witness configured. If an array group has a witness configured for Automatic Switchover and has Synchronous Replication configured, when a user tries to perform a pool merge, the following error is generated: "pool merge is not allowed when witness is configured". In this case, if the user removes the witness and then re-attempts the pool merge, the following error is then generated: "Pool merge is not allowed when involved in sync replication". This error should supersede the previous error.	
AS-93157	System Management	Array GUI does not specify which snapshots are unmanaged	The Array GUI does not specify which snapshots are unmanaged and no longer belong to a volume collection.	Run the following command via CLI: <code>snap --list --all --unmanaged</code>
AS-92379	System Management	Unable to Filter volumes using Synchronous Replication	There is currently no way to filter volumes using Synchronous Replication within the array GUI.	Use volume collections to check syncRep volumes, or use other filters to meet the needs