NetApp® FC, FCoE, iSCSI and NAS (NFS) Storage System Interoperability

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NDU Documentation - For complete information about non-disruptive upgrade, see the Data ONTAP Upgrade Guide for either Data ONTAP 7.2.5.1 or 7.3, available on NOW at http://now.netapp.com/NOW/knowledge/docs/ontap/rel7251/ and http://now.netapp.com/NOW/knowledge/docs/ontap/rel73/
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Storage Solution : Storage Area Network (SAN)

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Shared SAN Host Support for Heterogeneous Storage Support

NetApp supports shared SAN host configurations in which host servers are attached to both NetApp and non-NetApp storage systems, as defined hereafter. All components in the configuration must be supported by the individual storage system vendors. NetApp best practices to limit interoperability issues and facilitate diagnosis are that each vendor’s storage system be connected through a separate HBA and that each vendor’s target port be configured in its own zone (single-initiator zoning), and, when creating host-based volume containers, volumes and stripes do not span vendor storage systems.

For configurations not addressed below, please contact your account team or partner regarding the potential for a PVR.

Native Host OS Multipath - Accessing NetApp and third-party storage systems from a single host in which the host is using native OS multipath is supported with Data ONTAP 7.3 and later and with SSI controller failover mode, as long as the NetApp configuration requirements are met, as specified in the NetApp Host Utilities documents.

Symantec Veritas Storage Foundation DMP Multipath - Accessing NetApp and third-party storage systems from a single host is supported, as long as the configuration uses the NetApp Array Support Libraries for the applicable host operating environment and NetApp configuration requirements are met, as specified in the NetApp Host Utilities.

(PVR-Required) Native Host OS Multipath (NetApp) and EMC PowerPath (CLARiiON) - Accessing NetApp storage systems via native OS multipathing and EMC CLARiiON storage systems via EMC PowerPath from a single host is supported via PVR. For configurations not listed, please contact your account team or partner regarding the potential for a PVR.

Windows: EMC CLARiiON w/PowerPath 4.5+, or EMC Symmetrix w/PowerPath 5.3+ and connected to NetApp FAS via Data ONTAP DSM 3.3.1 for Windows MPIO and later.

Solaris: EMC CLARiiON and Symmetrix w/ PowerPath 5+ and connected to NetApp FAS via SUN Traffic Manager (MPxIO)

AIX: EMC CLARiiON and Symmetrix w/ PowerPath 5+ and connected to NetApp FAS via AIX MPIO

EFI boot support

EFI (Extensible Firmware Interface), or UEFI (Unified Extensible Firmware Interface), is a replacement for the older server BIOS firmware. UEFI-based servers can SAN boot from a LUN on a NetApp storage system. The steps for configuring the new UEFI boot are different, but the concepts are the same as booting a system with server BIOS. See your server and storage adapter documentation for specific configuration steps.

SAN boot using standard EFI or UEFI boot is supported only for hosts running HP-UX 11i/v2, HP-UX 11i/v3, and later. Check the specific configuration in IMT to be sure SAN booting is supported.

For all other host operating systems, SAN boot is supported only using the UEFI Legacy Option (BootBIOS).

Oracle

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Third-party Virtualization Appliance Support - IBM Storage Virtualization Controller (SVC)
NetApp supports IBM's support of FAS storage systems with SVC. In the event of configuration support situations, NetApp will diagnose basic storage hardware operations and IBM support owns overall connectivity and configuration management and support for SVC deployments. SVC configurations require a NetApp PVR for support, which provides an escalation process to IBM support and/or IBM SVC engineering. IBM maintains supported configurations for IBM N series and FAS storage systems at http://www-01.ibm.com/support/docview.wss?uid=ssg1S1003277&rs=555#_IBM_N_Series

Ethernet Switch Support
NetApp supports all traditional (non-Data Center Bridging) 10GbE switches with iSCSI and NAS without specific model reference in the IMT.

NetApp supports enhanced (Data Center Bridging capable) 10GbE switches with iSCSI and NAS without specific model reference. For FCoE configurations, supported 10GbE switches are listed by specific model reference.

Ethernet Host NIC, TCP/IP Offload (TOE) Adapter, Host Bus Adapter (HBA), and Converged Network Adapter (CNA) Model Support

Standard rack and tower servers (listed by CPU architecture and OS)
- NetApp supports Fibre Channel HBAs by specific model and driver reference in the IMT for listed configurations on standard rack and tower servers.
- NetApp supports the FCoE functionality of CNAs by specific model and driver reference in the IMT for listed configurations on standard rack and tower servers.
- NetApp supports the iSCSI offload functionality of CNAs by specific model and driver reference in the IMT for listed configurations on standard rack and tower servers.
- NetApp supports 1GE and 10GE iSCSI offload adapters by specific model and driver reference in the IMT for listed configurations on standard rack and tower servers.
- NetApp supports all 1GE and 10GE NICs (network interface cards), 10GE CNAs, and built-in Ethernet adapters on the server motherboards for software iSCSI and NAS configurations on standard rack and tower servers. Specific NIC or adapter models are not listed. The rest of the configuration must be listed in the IMT.
- NetApp supports all 1GE and 10GE TCP/IP offload (TOE) adapters for software iSCSI and NAS configurations on standard rack and tower configurations. Specific TOE models are not listed. The rest of the configuration must be listed in the IMT.

NetApp supports third-party HBA models that are based on original equipment manufacturer models from Brocade, Emulex and QLogic. The HBA must be used with NetApp-qualified driver and firmware levels and within configurations outlined in the IMT. For example, to use a QLogic HBA with an IBM model number, find the equivalent QLogic model and use the QLogic HBA model to find supported configurations in the IMT. This applies only to standard rack and tower servers. For blade server configurations, see below.

You can find mappings from the third-party HBA model number to the vendor part number at these locations:
- QLogic: http://www.qlogic.com/Products/adapters/Pages/FibreChannelAdapters.aspx (click the Show link for your adapter series, then open the OEM-Branded Adapters link)

Blade servers (listed by specific blade server models)
- NetApp specifically lists supported mezzanine cards and integrated adapters for blade server configurations within the IMT. You must use the drivers and firmware required by the blade vendor, as listed in the IMT. Drivers, firmware and BootBIOS must be downloaded from the blade vendor's web site or from a location specified by the blade vendor.
- You must use the exact mezzanine card or integrated adapter listed in the IMT for FC, FCoE, and iSCSI offload configurations. Do not attempt to map a model number from one manufacturer to another.
- NetApp supports all 1GE and 10GE NICs (network interface cards), 10GE CNAs, and built-in Ethernet adapters on the server motherboards for software iSCSI and NAS blade server configurations. Specific NIC or adapter models are not listed. The rest of the blade server configuration must be listed in the IMT.
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Third-party Certifications with NetApp Storage Systems
Beyond qualification by NetApp and listing in the NetApp Interoperability Matrix, NetApp participates in the certification activities of ecosystem parties, as listed below. For additional certifications not listed herein, please work with your account team or partner through the PVR process.
Virtualization


This provides support for both the combined download Microsoft® Hyper-V™ Server 2008 the dedicated stand-alone product, which contains only the Windows Hypervisor, Windows Server driver model and virtualization components, as well as support for Microsoft Windows Server 2008 Hyper-V which is the Windows Server running the Hyper-V as a role. Note that Microsoft Windows Server 2008 Hyper-V does not run on Standard Edition.

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Storage Solution : SnapDrive For Unix (SDU)

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NetApp Interoperability Matrix

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<tr>
<td>SnapManager for Oracle (SMO)</td>
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</tbody>
</table>
## NetApp Interoperability Matrix

**Table: NetApp Interoperability Matrix**

<table>
<thead>
<tr>
<th>Name</th>
<th>Status</th>
<th>Foot notes</th>
<th>Protocol</th>
<th>SNAPManager</th>
<th>SNAPDrive</th>
<th>Host OS</th>
<th>Host-Application</th>
<th>ONTAP OS</th>
<th>Host Multithread</th>
<th>Host Feature</th>
<th>Operations Manager</th>
<th>Protection Manager</th>
<th>OnCommand Core Package</th>
<th>Browser</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011020-122449279</td>
<td>Supported</td>
<td>Info: 644,646,2001 2002,2242,2 663,309,309 5,331,5,038, 5157,5161,52 56,5256,5260,5761,5803,5 805,806</td>
<td>FC</td>
<td>SnapManager for Oracle 3.2 SnapManager for Oracle 3.2 Linux x86</td>
<td>SnapDrive for Unix 5.0 Linux x64</td>
<td>RHEL Server 5.7 32-bit; RHEL Server 5.7 64-bit</td>
<td>Oracle 10g R2 (10.2.0.4); Oracle 10g R2 (10.2.0.5); Oracle 11g R1 (11.1.0.7); Oracle 11g R2 (11.2.0.1); Oracle 11g R2 (11.2.0.2); Oracle 11g R2 (11.2.0.3)</td>
<td>NetApp Data ONTAP 7.3.6; NetApp Data ONTAP 7.3.7</td>
<td>Red Hat RHEL Device Mapper (DM-MP)</td>
<td>Not Applicable</td>
<td>Oracle Clusterware</td>
<td>Operations Manager with DataFabric Manager Server 4.0; Operations Manager with DataFabric Manager Server 4.0; Operations Manager with DataFabric Manager Server 4.0.2</td>
<td>OnCommand Core Package 5.0</td>
<td>Mozilla Firefox 3.6.13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alerts: 2061, 5009, 51 55,5264,5331, 5435,5447,5 625,5268,562 9,5804,5813, 5814</td>
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</tbody>
</table>

## Alerts

### Note ID: 5155

**Text:** SnapManager for Oracle does not support user_friendly_names and aliasing in linux multipathing environment.

### Note ID: 5009

**Text:**

SnapManager for Oracle supports the ability to create RDM directly inside the Guest Virtual Machine for FC Protocol. This ability is supported on Linux (RHEL 5u6, 5u5, 5u4, 4u9, 4u8 and 4u7) and Solaris 10u6 Guest Operating Systems running on VMware ESX and ESXi 3.5 (update 4 and 5), ESX and ESXi 4.0 (Update1, Update2 and Update3), ESX and ESXi 4.1 and ESXi 5.0 with vCenter version 4.0, 4.1 and 5.0 along with SMVI version 3.0,3.0.1 and VSC version 2.0,2.0.1.2.1 and 2.1

**Limitations:**

With SMVI 3.0 and VSC 2.0, we cannot use long LUN names (which exceeds 126 characters). This limitation comes with VMware that leads to failure of RDM LUN creation.

### Note ID: 5813

**Text:** SnapManager for Oracle and SAP requires the following Oracle patches for managing an Oracle 11.2.0.3 Database:

Patch 13366202 is required for all Unix operating systems.
Patch 13413167 is required for Windows 32 bit operating systems.
Patch 13555974 is required for Windows 64 bit operating systems.

Since Oracle patch 13366202 is not yet available from Oracle on Solaris x86, 64 and HP-UX PA-RISC, SnapManager does not support managing an Oracle 11.2.0.3 Database on Solaris x86, 64 and HP-UX PA-RISC platforms.

### Note ID: 5628

**Text:** SnapManager supports Oracle version 11.2.0.2 with patchsets 11.2.0.2.2, 11.2.0.2.3, 11.2.0.2.4 and 11.2.0.2.5 only.

### Note ID: 2661

**Text:**

SnapManager for Oracle can backup(offline only), clone, but not restore, physical standby databases created using Oracle Data Guard. This applies to Oracle 10.2.0.4, 11.1.0.7, 11.2.0.1 and 11.2.0.2.

10.2.0.5 Support for physical standby databases:

SnapManager 3.1P1 for Oracle does not support Oracle Data Guard for Oracle 10.2.0.5 physical standby databases. See Burt 496325.

However, this BURT is fixed in SnapManager 3.2 for Oracle release.

Support for Active Data Guard:

SnapManager for Oracle DOES NOT support Oracle Active Data Guard.
<table>
<thead>
<tr>
<th>Note ID</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>5435</td>
<td>SnapManager 3.1P1 for Oracle supports managing Oracle 9i (9.2.0.8), 10gR2 (10.2.0.4), 10gR2 (10.2.0.5), 11gR1 (11.1.0.7), 11gR2 (11.2.0.1) and 11gR2 (11.2.0.2) databases on the same host running 64 bit Solaris (SPARC and x86_64) or 32/64 bit Linux (RHEL, SuSE and OEL) or Windows (2003 and 2008). SnapManager 3.2 for Oracle supports managing Oracle 10gR2 (10.2.0.4), 10gR2 (10.2.0.5), 11gR1 (11.1.0.7), 11gR2 (11.2.0.1) and 11gR2 (11.2.0.2) databases on the same host running 64 bit Solaris (SPARC and x86_64) or 32/64 bit Linux (RHEL, SuSE and OEL) or Windows (2003 and 2008).</td>
</tr>
<tr>
<td>5331</td>
<td>If you plan to setup Oracle 9i (9.2.0.8), 10gR2 (10.2.0.4) or (10.2.0.5), 11gR1 (11.1.0.7) and 11gR2 (11.2.0.1) or (11.2.0.2) databases on the same host using an Oracle 11gR2 grid infrastructure, then to avoid snvf issues, ensure that you install the Oracle patches or perform necessary workaround suggested in the following Oracle Metalink: <a href="https://support.oracle.com/CSP/main/article?cmd=show&amp;type=NOT&amp;id=948456.1">https://support.oracle.com/CSP/main/article?cmd=show&amp;type=NOT&amp;id=948456.1</a> Starting with SnapManager 3.2 for Oracle/SAP, Oracle 9i (9.2.0.8) is no longer supported.</td>
</tr>
<tr>
<td>5627</td>
<td>Please refer LHU release notes and public BURTs for known issues.</td>
</tr>
<tr>
<td>5715</td>
<td>SnapDrive for UNIX and SnapManager for Oracle/SAP support Data ONTAP 8.1 operating in either 7-Mode or Cluster-Mode only if using Data ONTAP 8.1 RC3. If you are using SnapManager for Oracle/SAP and or SnapDrive for Unix, do not upgrade to or install Data ONTAP 8.1 RC1 or RC2. Refer BURT 545332 for more details.</td>
</tr>
<tr>
<td>5447</td>
<td>SnapManager 3.1P1 and 3.2 for Oracle and SnapManager 3.1P1 and 3.2 for SAP software are available only in 64-bit versions for AIX, HP-UX, and Solaris platforms. On these platforms SnapManager supports only 64-bit Oracle databases. For Windows and Linux platforms, both 32-bit and 64-bit versions of SnapManager 3.1P1 and 3.2 for Oracle and SnapManager 3.1P1 and 3.2 for SAP are available. Although, both 32-bit and 64-bit Oracle versions are supported by SnapManager on Windows and Linux platforms, a 32-bit host should only be running 32-bit versions of Oracle databases and 32-bit version of SnapManager 3.1P1 or 3.2. Similarly a 64-bit Windows or Linux host should only be running 64-bit versions of Oracle databases and 64-bit version of SnapManager 3.1P1 or 3.2. Please use the NetApp Interoperability Matrix Tool (IMT) to confirm that you are running a configuration supported by SnapManager 3.1P1 and 3.2.</td>
</tr>
<tr>
<td>5626</td>
<td>Supported kernel version is 2.6.18-274.3.1.el5</td>
</tr>
<tr>
<td>5629</td>
<td>SnapManager for Oracle and SAP does not support Oracle Real Application Clusters One Node (Oracle RAC One Node) on Oracle 11gR2 databases. Refer <a href="https://kb.netapp.com/support/index?page=content&amp;id=3011226">https://kb.netapp.com/support/index?page=content&amp;id=3011226</a> for partitioning schemes supported by SnapDrive for UNIX</td>
</tr>
<tr>
<td>5013</td>
<td>Refer <a href="https://kb.netapp.com/support/index?page=content&amp;id=3011226">https://kb.netapp.com/support/index?page=content&amp;id=3011226</a> for partitioning schemes supported by SnapManager for Oracle when ASM is used in RHEL, OEL and SUSE environments.</td>
</tr>
<tr>
<td>5264</td>
<td>Refer the KB Article <a href="https://kb.netapp.com/support/index?page=content&amp;id=3011226">https://kb.netapp.com/support/index?page=content&amp;id=3011226</a> for partitioning schemes supported by SnapManager for Oracle and SAP do not support Veritas Mirrored logical volumes and disk groups with Mirrored plexes.</td>
</tr>
<tr>
<td>5804</td>
<td>SnapDrive for UNIX and SnapManager for Oracle/SAP do not support Veritas Mirrored logical volumes and disk groups with Mirrored plexes.</td>
</tr>
<tr>
<td>5127</td>
<td>SnapDrive for UNIX do not support user_friendly_names and aliasing in linux multipathing environment</td>
</tr>
<tr>
<td>5195</td>
<td>SnapDrive for UNIX does not support more than 1024 LUN paths or device files per Linux host. This limit has been extended to 4096 in SDU 4.1.0T17 and SDU 4.2P1</td>
</tr>
<tr>
<td>5814</td>
<td>SnapManager for Oracle and SAP do not support managing an Oracle ASM 11.2.0.3 Database on NFS. Refer to BURT 574023 for more details.</td>
</tr>
<tr>
<td>5625</td>
<td>Oracle patches #11666137 and #11785938 are required when using SnapManager for Oracle with Oracle version 11.2.0.2 and ASM.</td>
</tr>
<tr>
<td>Note ID</td>
<td>Text</td>
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<td>---------</td>
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<tr>
<td>5806</td>
<td>SnapDrive for UNIX and SnapManager for Oracle/SAP do not support co-existence of veritas and Native stacks.</td>
</tr>
<tr>
<td>5803</td>
<td>SnapManager supports symbolic links on NFS only for non-ASM environments.</td>
</tr>
<tr>
<td>644</td>
<td>Please refer to the SnapDrive for Unix storage solution in the IMT for components not covered in the SnapManager storage solution.</td>
</tr>
<tr>
<td>5196</td>
<td>SnapDrive for UNIX do not support CLVM (Cluster Logical Volume Manager)</td>
</tr>
<tr>
<td>5258</td>
<td>SnapManager for Oracle does not support more than 1024 LUN paths or device files per Linux host. This limit has been extended to 4096 in SDU 4.1.1D17 and SDU 4.2P1.</td>
</tr>
<tr>
<td>3095</td>
<td>SnapManager for Oracle Repository is supported on Oracle Express, Standard, and Enterprise Editions.</td>
</tr>
<tr>
<td>3315</td>
<td>SnapManager for Oracle is supported on Linux (RHEL, OEL and SLES) Guest Operating Systems running on VMware ESX 3.0.2, ESX 3.5 and ESX 4.0 (all Updates for each of them), using NIFS and iSCSI SW Initiator.</td>
</tr>
<tr>
<td>5197</td>
<td>SnapDrive for UNIX supports only native, software iSCSI initiators</td>
</tr>
<tr>
<td>2001</td>
<td>Oracle 10gR2 (10.2.0.4 or 10.2.0.5) is required for any managed instance of Oracle 10g including the SMO Repository. Oracle 10G R2 with patchset 10.2.0.4 or 10.2.0.5 is required for deploying RAC.</td>
</tr>
<tr>
<td>3094</td>
<td>The SnapManager Repository is supported on Oracle Express, Standard, Standard ONE and Enterprise Editions. However, only Oracle Standard, Standard ONE and Enterprise Editions databases can be managed by SMO.</td>
</tr>
<tr>
<td>1089</td>
<td>SDU (SDU 4.0 onwards) is dependent on Operations Manager for RBAC (Role Based Access Control) support. SDU (SDU 4.1 onwards) is also dependent on Protection Manager for Datasets support.</td>
</tr>
<tr>
<td>5341</td>
<td>SnapDrive for Unix is supported on RHEL5U4 guests on any RHEL 5U4 KVM hypervisor for iSCSI and NFS configurations only. SnapDrive for Unix is supported on RHEL5U4, SUSE and SUSE guests on any RHEL 5U5 and 5U6 KVM hypervisors for iSCSI and NFS configurations only. SnapDrive for Unix is supported on RHEL5U5 and 5U6 guests on any RHEL 6 and 6U1 KVM hypervisor for iSCSI and NFS configurations only.</td>
</tr>
<tr>
<td>3314</td>
<td>SnapDrive for Unix is supported on Linux (RHEL, OEL and SLES) Guest Operating Systems running on VMware ESX 3.0.2, ESX 3.5 and ESX 4.0 (all Updates for each of them), using NIFS and iSCSI SW Initiator.</td>
</tr>
<tr>
<td>2663</td>
<td>SnapManager 3.0.1 for Oracle or later supports Oracle VM on an Oracle standalone NFS and iSCSI environment.</td>
</tr>
<tr>
<td>5038</td>
<td>SnapManager for Oracle does not support raw logical volumes with Veritas Volume Manager.</td>
</tr>
<tr>
<td>5157</td>
<td>SnapManager for Oracle support for VCS is only in Active-Passive mode.</td>
</tr>
<tr>
<td>Note ID</td>
<td>Text</td>
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</tbody>
</table>
| 2002    | For Oracle 10gR2 with patchset 10.2.0.4 plus Oracle patches 4693355 and 7330611 is required for deploying ASM on NFS in SnapManager for Oracle.  
For Oracle 11gR1 with patchset 11.1.0.7 plus Oracle patch 7330611 is required for deploying ASM on NFS for SnapManager for Oracle.  
Patches can be downloaded from https://metalink.oracle.com |
| 2242    | SnapManager is dependent on Operations Manager for RBAC (Role Based Access Control) support and on Protection Manager for Datasets support. |
| 5805    | SnapDrive for UNIX and SnapManager for Oracle/SAP do not support co-existence of iSCSI and FC transport protocols. |
| 646     | SnapManager for Oracle works for all NetApp storage systems, V-Series, and NearStore platforms supported by Data ONTAP 7G. |
| 5256    | SnapManager for Oracle does not support CLVM (Cluster Logical Volume Manager) |
| 5701    | SnapManager 3.2 for Oracle/SAP GUI requires SUN JRE version 1.6.0. JRE updates required platform-wise are outlined below:  
- Linux (AMD64)  
- Linux (x86)  
- Solaris (SPARC)  
- Solaris (x86_64)  
- AIX (ppc64)  
- HP-UX, PA-RISC)  
- HP-UX (IA64)  
- Windows (x86)  
- Windows (x86_64)  

SnapManager for Oracle does not support ALUA in Veritas environments. |
| 5161    | SnapManager for Oracle supports ALUA on RHEL SUI and later with ONTAP 7.3.0 and later |