

# **NetApp Solution Automation**

**NetApp Solutions** 

Nikhil M Kulkarni March 04, 2021

This PDF was generated from https://docs.netapp.com/us-en/netapp-solutions/automation/deploy\_mellanox\_awx.html on August 03, 2021. Always check docs.netapp.com for the latest.

# **Table of Contents**

NetApp Solution Automation		1
----------------------------	--	---

# **NetApp Solution Automation**

### **Procedure**

To configure Mellanox switches using Ansible playbooks via AWX/Ansible Tower, follow the below procedure:

- 1. Configure the AWX/Tower parameters by following the guide here
- 2. Fill the variables below based on the recommendations/suggestions provided. Once all the variables are filled as per requirement, copy the content by clicking 'Copy' button at the top.

```
<style>
div {
position: relative;
div button {
position: absolute;
top: 0;
right: 0;
button {
 transition-duration: 0.4s;
 background-color: white;
  color: #1563a3;
  border: 2px solid #1563a3;
button:hover {
  background-color: #1563a3;
  color: white;
#more vlans {
 display: block;
#more vlans button {
  display: none;
#more peerlink interfaces {
  display: block;
#more peerlink interfaces button {
  display: none;
#more storage interfaces {
  display: block;
#more storage interfaces button {
  display: none;
```

```
#more storage mgmt interfaces {
 display: block;
#more storage mgmt interfaces button {
 display: none;
#more compute interfaces {
 display: block;
#more compute interfaces button {
 display: none;
#more uplink interfaces {
 display: block;
#more uplink interfaces button {
 display: none;
</style>
<div class="listingblock"><div class="content"><div><button id="copy-</pre>
button" onclick="CopyClassText()">Copy</button></div><code><div
class="CopyMeClass" id="CopyMeID"># vars file for nar hci mellanox deploy
#Hosts group name
#Default hosts group name - 'mellanox'
#Change only if you are changing the hosts group name either in hosts file
or in inventory groups in case of AWX/Tower
hosts: <span <div contenteditable="true"/><i>mellanox</i></span>
#These set of variables will setup the Mellanox switches for NetApp HCI
that uses a 2-cable compute connectivity option.
#Ansible connection variables for mellanox
ansible connection: network cli
ansible network os: onyx
# Primary Variables
#Necessary VLANs for Standard NetApp HCI Deployment [native, Management,
iSCSI Storage, vMotion, VM Network, IPL]
#Any additional VLANs can be added to this in the prescribed format below
<br>netapp hci vlans:
  - {vlan id: <span <div contenteditable="true"/><i>2</i></span>,
vlan name: "<span <div</pre>
contenteditable="true"/><i>OB Management</i></span>&quot;}
```

```
- {vlan id: <span <div contenteditable="true"/><i>3488</i></span>,
vlan name: "<span <div</pre>
contenteditable="true"/><i>IB Managment</i></span>&quot;}
  - {vlan id: <span <div contenteditable="true"/><i>3489</i></span>,
vlan name: "<span <div</pre>
contenteditable="true"/><i>vMotion</i></span>&quot;}
  - {vlan id: <span <div contenteditable="true"/><i>3490</i></span>,
vlan name: "<span <div</pre>
contenteditable="true"/><i>iSCSI Storage</i></span>&quot;}
  - {vlan id: <span <div contenteditable="true"/><i>3487</i></span>,
vlan name: "<span <div</pre>
contenteditable="true"/><i>Application</i></span>&quot;}
  - {vlan id: <span <div contenteditable="true"/><i>3491</i></span>,
vlan name: "<span <div</pre>
contenteditable="true"/><i>NFS</i></span>&quot; }
  - {vlan id: <span <div contenteditable="true"/><i>4000</i></span>,
vlan name: "<span <div</pre>
contenteditable="true"/><i>IPL</i></span>&quot;}
  - {vlan id: <span <div contenteditable="true"/><i>2</i></span>,
vlan name: "<span <div</pre>
contenteditable="true"/><i>Native</i></span>&quot;}
<a id="more vlans" href="javascript:vlandropdown();">More VLANs</a><div</pre>
id="select more vlans"></div><a id="more vlans button"</pre>
href="javascript:addvlans();">Enter VLAN details</a><div</pre>
id="extra vlans"></div>
#LACP load balancing algorithm for IP hash method
#Possible options are: 'destination-mac', 'destination-ip', 'destination-
port', 'source-mac', 'source-ip', 'source-port', 'source-destination-mac',
'source-destination-ip', 'source-destination-port'
#This variable takes multiple options in a single go
#For eq: if you want to configure load to be distributed in the port-
channel based on the traffic source and destination IP address and port
number, use 'source-destination-ip source-destination-port'
#By default, Mellanox sets it to source-destination-mac. Enter the values
below only if you intend to configure any other load balancing algorithm
#Make sure the load balancing algorithm that is set here is also
replicated on the host side
#Recommended algorithm is source-destination-ip source-destination-port
lacp load balance: "<span <div contenteditable="true"/><i>source-
destination-ip source-destination-port</i></span>&quot;
#-----
# IPL variables
#Inter-Peer Link Portchannel
```

```
#ipl portchannel to be defined in the format - Po100
ipl portchannel: <span <div contenteditable="true"/><i>Po100</i></span>
#Inter-Peer Link Addresses
#The IPL IP address should not be part of the management network. This is
typically a private network
ipl ipaddr a: <span <div contenteditable="true"/><i>10.0.0.1</i></span>
ipl ipaddr b: <span <div contenteditable="true"/><i>10.0.0.2</i></span>
#Define the subnet mask in CIDR number format. Eg: For subnet /22, use
ipl ip subnet: 22
ipl ip subnet: <span <div contenteditable="true"/><i>24</i></span>
#Inter-Peer Link Interfaces
#members to be defined with Eth in the format. Eq: Eth1/1
peer link interfaces:
  description: " <span <div contenteditable="true"/><i>peer link
interfaces</i></span>&quot;
 members:
    - " <span <div contenteditable="true"/><i>Eth1/20</i></span>&quot;
    - " <span <div contenteditable="true"/><i>Eth1/22</i></span>&quot;
<a id="more peerlink interfaces" href="javascript:ipldropdown();">More
Peer-Link Interfaces</a><div id="select more peerlink interfaces"></div><a
id="more peerlink interfaces button" href="javascript:addipls();">Enter
peer-link Interface details</a><div id="extra peerlink interfaces"></div>
#MLAG VIP IP address should be in the same subnet as that of the switches'
mgmt0 interface subnet
#mlag vip ip to be defined in the format - <vip ip>/<subnet mask>. Eg:
x.x.x.x/y and must be unique for each MLAG domain
mlag vip ip: <span <div</pre>
contenteditable="true"/><i>10.195.60.111/24</i></span>
#MLAG VIP Domain Name
#The mlag domain must be unique name for each mlag domain.
#In case you have more than one pair of MLAG switches on the same network,
each domain (consist of two switches) should be configured with different
mlag domain name: <span <div contenteditable="true"/><i>MLAG-VIP-DOM-10-
16</i></span>
#-----
# Interface Details
#-----
#Storage Bond10G Interface details
```

```
#members to be defined with Eth in the format. Eg: Eth1/1
#Only numerical digits between 100 to 1000 allowed for mlag id
#Operational link speed [variable 'speed' below] to be defined in terms of
bytes.
#For 10 Gigabyte operational speed, define 10G. [Possible values - 10G and
#Interface descriptions append storage node data port numbers assuming all
Storage Nodes' Port C -> Mellanox Switch A and all Storage Nodes' Port D
-> Mellanox Switch B
#List the storage Bond10G interfaces, their description, speed and MLAG
IDs in list of dictionaries format
storage interfaces:
  - {members: " <span <div
contenteditable="true"/><i>Eth1/13</i></span>&quot;, description:
"<span <div</pre>
contenteditable="true"/><i>HCI Storage Node 01</i></span>&quot;, mlag id:
<span <div contenteditable="true"/><i>113</i></span>, speed: <span <div</pre>
contenteditable="true"/><i>10G</i></span>}
  - {members: " <span <div
contenteditable="true"/><i>Eth1/14</i></span>&quot;, description:
" <span <div
contenteditable="true"/><i>HCI Storage Node 02</i></span>&quot;, mlag id:
<span <div contenteditable="true"/><i>114</i></span>, speed: <span <div</pre>
contenteditable="true"/><i>10G</i></span>}
  - {members: " <span <div
contenteditable="true"/><i>Eth1/15</i></span>&quot;, description:
" <span <div
contenteditable="true"/><i>HCI Storage Node 03</i></span>&quot;, mlag id:
<span <div contenteditable="true"/><i>115</i></span>, speed: <span <div</pre>
contenteditable="true"/><i>10G</i></span>}
  - {members: " <span <div
contenteditable="true"/><i>Eth1/16</i></span>&quot;, description:
" <span <div
contenteditable="true"/><i>HCI Storage Node 04</i></span>&quot;, mlag id:
<span <div contenteditable="true"/><i>116</i></span>, speed: <span <div</pre>
contenteditable="true"/><i>10G</i></span>}
<a id="more storage interfaces" href="javascript:storagedropdown();">More
Interfaces towards Storage Nodes</a><div</pre>
id="select more storage interfaces"></div><a</pre>
id="more storage interfaces button"
href="javascript:addstorageinterfaces();">Enter Storage Interface
details</a><div id="extra storage interfaces"></div>
#Storage Bond1G Interface
#Mention whether or not these Mellanox switches will also be used for
Storage Node Mgmt connections
```

```
#Possible inputs for storage mgmt are 'yes' and 'no'
storage mgmt: <span <div contenteditable="true"/><i>no</i></span>
#Storage Bond1G (Mgmt) interface details. Only if 'storage mgmt' is set to
#Members to be defined with Eth in the format. Eq: Eth1/1
#Interface descriptions append storage node management port numbers
assuming all Storage Nodes' Port A -> Mellanox Switch A and all Storage
Nodes' Port B -> Mellanox Switch B
#List the storage Bond1G interfaces and their description in list of
dictionaries format
storage mgmt interfaces:
  - {members: " <span <div
contenteditable="true"/><i>Eth1/5</i></span>&quot;, description:
" < span < div
contenteditable="true"/><i>HCI Storage Node 01</i></span>&quot;}
  - {members: " <span <div
contenteditable="true"/><i>Eth1/6</i></span>&quot;, description:
" <span <div
contenteditable="true"/><i>HCI Storage Node 02</i></span>&quot;}
  - {members: " <span <div
contenteditable="true"/><i>Eth1/7</i></span>&quot;, description:
"<span <div</pre>
contenteditable="true"/><i>HCI Storage Node 03</i></span>&quot;}
  - {members: " <span <div
contenteditable="true"/><i>Eth1/8</i></span>&quot;, description:
" <span <div
contenteditable="true"/><i>HCI Storage Node 04</i></span>&quot;}
<a id="more storage mgmt interfaces"
href="javascript:storagemgmtdropdown();">More management interfaces
towards storage nodes</a><div
id="select more storage mgmt interfaces"></div><a</pre>
id="more storage mgmt interfaces button"
href="javascript:addstoragemgmtinterfaces();">Enter Storage Management
Interface details</a><div id="extra storage mgmt interfaces"></div>
#Compute Interface details
#Members to be defined with Eth in the format. Eg: Eth1/1
#Fill the mlag id field only if you intend to configure interfaces of
compute nodes into bond or LAG with LACP
#In case you do not intend to configure LACP on interfaces of compute
nodes, either leave the mlag id field unfilled or comment it or enter NA
in the mlag id field
#In case you have a mixed architecture where some compute nodes require
LACP and some don't,
#1. Fill the mlag id field with appropriate MLAG ID for interfaces that
```

```
connect to compute nodes requiring LACP
#2. Either fill NA or leave the mlag id field blank or comment it for
interfaces connecting to compute nodes that do not require LACP
#Only numerical digits between 100 to 1000 allowed for mlag id.
#Operational link speed [variable 'speed' below] to be defined in terms of
#For 10 Gigabyte operational speed, define 10G. [Possible values - 10G and
25G]
#Interface descriptions append compute node port numbers assuming all
Compute Nodes' Port D -> Mellanox Switch A and all Compute Nodes' Port E
-> Mellanox Switch B
#List the compute interfaces, their speed, MLAG IDs and their description
in list of dictionaries format
compute interfaces:
  - members: " <span <div
contenteditable="true"/><i>Eth1/2</i></span>&quot;
    description: "<span <div</pre>
contenteditable="true"/><i>HCI Compute Node 01</i></span>&quot;
    mlag id: <span <div contenteditable="true"/><i> </i></span> #Fill the
mlag id only if you wish to use LACP on interfaces towards compute nodes
    speed: <span <div contenteditable="true"/><i>10G</i></span>
  - members: " <span <div
contenteditable="true"/><i>Eth1/4</i></span>&quot;
    description: " <span <div
contenteditable="true"/><i>HCI Compute Node 02</i></span>&quot;
   mlag id: <span <div contenteditable="true"/><i>104</i></span> #Fill
the mlag id only if you wish to use LACP on interfaces towards compute
nodes
    speed: <span <div contenteditable="true"/><i>10G</i></span>
<a id="more compute interfaces" href="javascript:computedropdown();">More
interfaces towards compute nodes</a><div
id="select more compute interfaces"></div><a</pre>
id="more compute interfaces button"
href="javascript:addcomputeinterfaces();">Enter Compute Interface
details</a><div id="extra compute interfaces"></div>
#Spanning-tree protocol type for uplink connections.
#The valid options are 'network' and 'normal'; selection depends on the
uplink switch model.
uplink stp type: <span <div contenteditable="true"/><i>network</i></span>
#Uplink Switch LACP support
#Possible options are 'yes' and 'no' - Set to 'yes' only if your uplink
switch supports LACP
uplink switch lacp: <span <div contenteditable="true"/><i>yes</i></span>
```

```
#Uplink Interface details
#Members to be defined with Eth in the format. Eq: Eth1/1
#Only numerical digits between 100 to 1000 allowed for mlag id.
#Operational link speed [variable 'speed' below] to be defined in terms of
bytes.
#For 10 Gigabyte operational speed, define 10G. [Possible values in
Mellanox are 1G, 10G and 25G]
#List the uplink interfaces, their description, MLAG IDs and their speed
in list of dictionaries format
uplink interfaces:
  - members: " <span <div
contenteditable="true"/><i>Eth1/18</i></span>&quot;
    description switch a: " <span <div
contenteditable="true"/><i>SwitchA:Ethx/y ->
Uplink Switch:Ethx/y</i></span>&quot;
    description switch b: " <span <div
contenteditable="true"/><i>SwitchB:Ethx/y ->
Uplink Switch:Ethx/y</i></span>&quot;
    mlag id: <span <div contenteditable="true"/><i>118</i></span> #Fill
the mlag id only if 'uplink switch lacp' is set to 'yes'
    speed: <span <div contenteditable="true"/><i>10G</i></span>
    mtu: <span <div contenteditable="true"/><i>1500</i></span>
<a id="more uplink interfaces" href="javascript:uplinkdropdown();">More
interfaces towards uplink switches</a><div</pre>
id="select more uplink interfaces"></div><a
id="more uplink interfaces button"
href="javascript:adduplinkinterfaces();">Enter Uplink Interface
details</a><div
id="extra uplink interfaces"></div></div></code></div></div>
<script>
function CopyClassText() {
    var textToCopy = document.getElementById("CopyMeID");
    var currentRange;
    if(document.getSelection().rangeCount > 0)
        currentRange = document.getSelection().getRangeAt(0);
        window.getSelection().removeRange(currentRange);
    else
       currentRange = false;
    var CopyRange = document.createRange();
    CopyRange.selectNode(textToCopy);
    window.getSelection().addRange(CopyRange);
```

```
document.getElementById("more vlans").style.display = "none";
    document.getElementById("more peerlink interfaces").style.display =
"none";
    document.getElementById("more storage interfaces").style.display =
    document.getElementById("more storage mgmt interfaces").style.display
= "none";
    document.getElementById("more compute interfaces").style.display =
    document.getElementById("more uplink interfaces").style.display =
"none";
   var command = document.execCommand("copy");
     if (command)
     {
          document.getElementById("copy-button").innerHTML = "Copied!";
          setTimeout(revert copy, 3000);
    window.getSelection().removeRange(CopyRange);
    if(currentRange)
        window.getSelection().addRange(currentRange);
function revert copy() {
     document.getElementById("copy-button").innerHTML = "Copy";
     document.getElementById("more vlans").style.display = "block";
     document.getElementById("more peerlink interfaces").style.display =
"block";
     document.getElementById("more storage interfaces").style.display =
"block";
document.getElementById("more storage mgmt interfaces").style.display =
"block";
     document.getElementById("more compute interfaces").style.display =
"block";
     document.getElementById("more uplink interfaces").style.display =
"block";
function vlandropdown() {
    document.getElementById("more vlans").style.display = "none";
    document.getElementById("more vlans button").style.display = "block";
   var x=1;
   var myHTML = '';
   var buildup = '';
   var wrapper = document.getElementById("select more vlans");
    while (x < 100) {
```

```
buildup += '<option value="' + x + '">' + x + '</option>';
      x++;
    }
    myHTML += '<a id="more vlans info">How many extra VLANs do you wish to
add?</a><select name="number of extra vlans" id="number of extra vlans">
+ buildup + '</select>';
    wrapper.innerHTML = myHTML;
function addvlans() {
    var y = document.getElementById("number of extra vlans").value;
   var j=0;
   var myHTML = '';
   var wrapper = document.getElementById("extra vlans");
    while (j < y) {
        j++;
        myHTML += ' - {vlan id: <span <div contenteditable="true"/><i>
</i></span>, vlan name: &quot;<span <div contenteditable="true"/><i>
</i></span>&quot;}<br>';
    wrapper.innerHTML = myHTML;
    document.getElementById("select more vlans").style.display = "none";
    document.getElementById("more vlans button").style.display = "none";
function ipldropdown() {
    document.getElementById("more peerlink interfaces").style.display =
"none";
document.getElementById("more peerlink interfaces button").style.display =
"block";
   var x=1;
   var myHTML = '';
   var buildup = '';
    var wrapper =
document.getElementById("select more peerlink interfaces");
    while (x < 10) {
       buildup += '<option value="' + x + '">' + x + '</option>';
    myHTML += '<a id="more peerlink interfaces info">How many more Peer-
Link Interfaces do you wish to add?</a><select
name="number of extra peerlink interfaces"
id="number of extra peerlink interfaces">' + buildup + '</select>';
    wrapper.innerHTML = myHTML;
function addipls() {
```

```
document.getElementById("number of extra peerlink interfaces").value;
   var j=0;
   var myHTML = '';
   var wrapper = document.getElementById("extra peerlink interfaces");
    while (j < y) {
        j++;
        myHTML += ' - "<span <div contenteditable="true"/><i>
</i></span>&quot; <br>';
    wrapper.innerHTML = myHTML;
document.getElementById("select more peerlink interfaces").style.display =
"none";
document.getElementById("more peerlink interfaces button").style.display =
"none";
function storagedropdown() {
    document.getElementById("more storage interfaces").style.display =
"none";
document.getElementById("more storage interfaces button").style.display =
"block";
   var x=1;
   var myHTML = '';
   var buildup = '';
   var wrapper =
document.getElementById("select more storage interfaces");
    while (x < 10) {
       buildup += '<option value="' + x + '">' + x + '</option>';
       x++;
    myHTML += '<a id="more storage interfaces info">How many more Storage
Interfaces do you wish to add?</a><select
name="number of extra storage interfaces"
id="number of extra storage interfaces">' + buildup + '</select>';
    wrapper.innerHTML = myHTML;
}
function addstorageinterfaces() {
document.getElementById("number of extra storage interfaces").value;
   var j=0;
   var myHTML = '';
   var wrapper = document.getElementById("extra storage interfaces");
    while (j < y) {
```

```
myHTML += ' - {members: "<span <div</pre>
contenteditable="true"/><i>Ethx/y</i></span>&quot;, description:
" <span <div
contenteditable="true"/><i>HCI Storage Node x</i></span>&quot;, mlag id:
<span <div contenteditable="true"/><i>xxx</i></span>, speed: <span <div</pre>
contenteditable="true"/><i>10G</i></span>}<br>';
    wrapper.innerHTML = myHTML;
document.getElementById("select more storage interfaces").style.display =
"none";
document.getElementById("more storage interfaces button").style.display =
"none";
function storagemgmtdropdown() {
    document.getElementById("more storage mgmt interfaces").style.display
= "none";
document.getElementById("more storage mgmt interfaces button").style.displ
ay = "block";
   var x=1;
   var myHTML = '';
   var buildup = '';
   var wrapper =
document.getElementById("select more storage mgmt interfaces");
    while (x < 10) {
       buildup += '<option value="' + x + '">' + x + '</option>';
       X++;
    myHTML += '<a id="more storage mgmt interfaces info">How many more
Storage Management Interfaces do you wish to add?</a><select
name="number of extra storage mgmt interfaces"
id="number of extra storage mgmt interfaces">' + buildup + '</select>';
    wrapper.innerHTML = myHTML;
function addstoragemgmtinterfaces() {
document.getElementById("number of extra storage mgmt interfaces").value;
   var j=0;
   var myHTML = '';
    var wrapper =
document.getElementById("extra storage mgmt interfaces");
    while (j < y) {
        j++;
```

```
myHTML += ' - {members: " <span <div</pre>
contenteditable="true"/><i>Ethx/y</i></span>&quot;, description:
" < span < div
contenteditable="true"/><i>HCI Storage Node x</i></span>&quot;}<br/>br>';
   wrapper.innerHTML = myHTML;
document.getElementById("select more storage mgmt interfaces").style.displ
ay = "none";
document.getElementById("more storage mgmt interfaces button").style.displ
ay = "none";
function computedropdown() {
   document.getElementById("more compute interfaces").style.display =
"none";
document.getElementById("more compute interfaces button").style.display =
"block";
   var x=1;
   var myHTML = '';
   var buildup = '';
   var wrapper =
document.getElementById("select more compute interfaces");
   while (x < 10) {
       buildup += '<option value="' + x + '">' + x + '</option>';
       x++;
   myHTML += '<a id="more compute interfaces info">How many more Compute
Interfaces do you wish to add?</a><select
name="number of extra compute interfaces"
id="number of extra compute interfaces">' + buildup + '</select>';
   wrapper.innerHTML = myHTML;
function addcomputeinterfaces() {
   var y =
document.getElementById("number of extra compute interfaces").value;
   var j=0;
   var myHTML = '';
   var wrapper = document.getElementById("extra compute interfaces");
   while (j < y) {
       j++;
       myHTML += ' - members: "<span <div</pre>
" <span <div
contenteditable="true"/><i>HCI Compute Node x</i></span>&quot;<br>
```

```
mlag id: <span <div contenteditable="true"/><i> </i></span> #Fill the
mlag id only if you wish to use LACP on interfaces towards compute
nodes<br> speed: <span <div</pre>
contenteditable="true"/><i>10G</i></span><br>';
    wrapper.innerHTML = myHTML;
document.getElementById("select more compute interfaces").style.display =
"none";
document.getElementById("more compute interfaces button").style.display =
"none";
function uplinkdropdown() {
    document.getElementById("more uplink interfaces").style.display =
"none";
    document.getElementById("more uplink interfaces button").style.display
= "block";
   var x=1;
   var myHTML = '';
   var buildup = '';
   var wrapper =
document.getElementById("select more uplink interfaces");
    while (x < 10) {
       buildup += '<option value="' + x + '">' + x + '</option>';
        x++;
    myHTML += '<a id="more uplink interfaces info">How many more Uplink
Interfaces do you wish to add?</a><select
name="number of extra uplink interfaces"
id="number of extra uplink interfaces">' + buildup + '</select>';
    wrapper.innerHTML = myHTML;
function adduplinkinterfaces() {
   var y =
document.getElementById("number of extra uplink interfaces").value;
   var j=0;
   var myHTML = '';
   var wrapper = document.getElementById("extra uplink interfaces");
   while (j < y) {
        j++;
        myHTML += ' - members: "<span <div</pre>
contenteditable="true"/><i>Ethx/y</i></span>&quot;<br>
description switch a: " <span <div
contenteditable="true"/><i>SwitchA:Ethx/y ->
Uplink Switch:Ethx/y</i></span>&quot;<br> description_switch_b:
```

- 3. Login to AWX/Tower, go to 'Resources' → 'Templates' and click on 'Launch' button for the appropriate Mellanox job template.
- 4. Paste the copied content in the variable field that is prompted, click on 'Next' and then click on 'Launch' to run the job template.

#### **Copyright Information**

Copyright © 2021 NetApp, Inc. All rights reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means-graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system-without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52-227-19 (June 1987).

### **Trademark Information**

NETAPP, the NETAPP logo, and the marks listed at <a href="http://www.netapp.com/TM">http://www.netapp.com/TM</a> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.