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1 Executive Summary

SolarWinds provides web-based network performance monitoring (NPM) software that allows users to quickly detect, diagnose, and resolve network performance issues and outages in the datacenter. SolarWinds also provides a plugin architecture for monitoring devices from different vendors. This document describes how to configure SolarWinds to monitor a Nutanix cluster using SNMP and Nutanix Universal Device Pollers (UNDPs).

2 Introduction

2.1 Audience


We have organized the document to address the key items for integrating a Nutanix cluster with SolarWinds, and have included a Nutanix UnDP file.

This end user license agreement for this document can be found in Appendix C.

2.2 Purpose

We provide an overview of the Nutanix architecture and procedures for configuring SolarWinds using the Nutanix UnDPs to monitor Nutanix clusters. After reading this document, the reader should be comfortable with using SolarWinds to monitor Nutanix clusters.

Our intent is to enable the SolarWinds community to get started on monitoring Nutanix. This guide and the UnDPs will significantly reduce the time to configure Nutanix in SolarWinds and make it easier to integrate Nutanix in the datacenters.
3 Nutanix Overview

3.1 What Is the Nutanix Architecture?

The Nutanix Virtual Computing Platform is a scale-out, hyper-converged system of high-performance nodes, or servers, each running a standard hypervisor and containing processors, memory, and local storage (consisting of SSD Flash and high capacity SATA disk drives). Each node runs virtual machines just like a standard virtual machine host.

![Figure 1: Nutanix Node Architecture](image1)

In addition, local storage from all nodes is virtualized into a unified pool by the Nutanix Distributed File System (NDFS). In effect, NDFS acts like an advanced networked or shared storage system that uses local SSDs and disks from all nodes to store virtual machine data. Virtual machines running on the cluster write data to NDFS as if they were writing to shared storage.

![Figure 2: Nutanix Architecture](image2)
3.2 About Universal Device Pollers

UnDPs are used to monitor devices. Nutanix has created basic UnDPs to enable cluster monitoring. SolarWinds allows you to collect configuration information and to monitor specific elements, devices, or systems without agents. SolarWinds describes UnDPs in their documentation as follows: “The Universal Device Poller allows you to easily add any SNMP-enabled device into the local monitoring database and collect any statistics or information that are referenced in device MIB tables. Using poller transforms available in the Universal Device Poller Wizard, you can also manipulate data collected from multiple Universal Device Pollers to create your own custom statistics and then choose your own customized data display. You may also use Network Atlas to map your Universal Device Pollers.”
4 Prerequisites

The SolarWinds NPM software must be installed and functional before proceeding with monitoring a Nutanix cluster.

Installing and configuring SolarWinds is outside the scope of this document. If you require any information on installing SolarWinds, refer to Appendix A of this document.

4.1 Installed Reference Environment

The following software versions were used to create UnDPs:

- Windows Server 2008 R2 SP1 installed on a 64-bit OS
- NPM 11.5
- NOS 4.1.1

This document should be used in conjunction with the UnDP files provided by Nutanix.
5 Configure a Device to Monitor

You can monitor a network device in SolarWinds by creating its Universal Device Poller (UnDP). SolarWinds provides tools to create these UnDPs. After they are created, these UnDPs can be imported to display the monitoring information in the web console.

The process of monitoring a device consists of the following key steps:

1. Import the UnDPs.
2. Customize the views for display, including Device View, Chart Resource, and Table Views.
3. Add cluster to NPM.

5.1 Import Universal Device Pollers

The Universal Device Poller (UnDP) application is used to create, save, import, and export the Pollers.

As shown below, the Universal Device Poller can be launched from a Windows 2008 Server R2:

Navigate to Start Menu. Click Programs, then SolarWinds Orion, then Network Performance Monitor, and finally, Universal Device Poller.
The following snapshots provide the key sequences of the import process:
If any of the Pollers were already imported (manually or via import), it will display this warning:
5.1.1 About UnDP

A UnDP is the definition of an attribute to be monitored in the web console. It has its own syntax and is written in XML to a file with a “.UnDP” extension. Below is an example for the “clusterIops” attribute:

```xml
<CustomPollers version="9.0">
  <CustomPoller UniqueName="clusterIops" Description="Cluster wide average IO operations per second." OID="1.3.6.1.4.1.41263.506.0" MIB="NUTANIX-MIB:clusterIops" SNMPGetType="Get" NetObjectPrefix="N" GroupName="Nutanix Cluster Pollers" Parser="Gauge" IncludeHistory="True" Unit="" TimeUnitId="1" TimeUnitQuantity="0" DefaultDisplayTimeUnitId="0" Formula="" LabelType="" LabelDetail=""/>
</CustomPollers>
```
5.2 Create a Nutanix Device View

A Nutanix-specific view is useful for specifying which SNMP tables and graphs need to be displayed for the device in the Orion NPM web console. To create the Nutanix details view, do the following:

1. Launch the Orion NPM web console from the Windows Start menu:

![Login Screen]

You can log in with the username admin and no password.
To change the Admin password after you log in, click Settings > Manage Accounts.

2. Navigate to Settings (the top-right corner menu). Click Views, then Manage Views.

![Views Menu]

Each View can be customized. You can select which charts and device properties are displayed on each view.
3. When you click Manage Views, the following is displayed.

4. Navigate down the list to Node Details - Summary
5. Select Copy.
6. The following screen is displayed. Many of the entries are of the form Copy of Node Details - <View Name>, where <view name> includes Network, Storage, Summary, Virtualization Summary, and Vital Stats from the original list.

7. Select Edit, as shown above. The Customize Copy of Node Details dialog box appears, where you can customize details.
8. Rename the view, “Nutanix Node Details.”

9. Click Update, then click Done.

10. The following screen displays the information—Notice the name, Nutanix Node Details – <ViewName>.
5.3 Assign a Chart Resource to the New View

This is a two-step process:

1. Add Pollers using the Orion Universal Device Poller windows application.
2. Customize the views through the NPM Web Console.

Universal Device Pollers can now be added to the new customized view:

- Open the Orion Universal Device Poller.
- Right-click on a Poller from the list of All Defined Pollers.
- Select Web Display.
The above will add clusterlops to the Nutanix Node Details-Summary view. Add other attributes (for example, Name and Capacity) in the same way.
Open the Orion NPM web console and navigate to Settings, then click Manage Views.
Select Nutanix Node Details from the list and click Edit.
The following screen is displayed. Note that all the UnDPs added in previous steps are listed here:

Adjust the order of columns as desired and then click Done to save the configuration of Resources.
5.4 Add a Table Object (Container)

- Invoke the Windows application Orion Universal Device Poller for the UnDP.
- Select the container, then select Web display.

Note: Be sure to check the table column for each of the container-table’s tabular-attributes.
Note: The other Nutanix table objects, such as Storage and CVMs, can be added using the same process as described above.
5.5 Add a Nutanix Cluster to NPM

1. Add an SNMP user on the Nutanix cluster.
2. Configure the SNMP details in NPM, including the SNMP user’s credentials.

5.6 Add an SNMP User on a Nutanix Cluster

An SNMP V3 user needs to be defined on a Nutanix cluster using the Prism UI.
1. Log on to Prism and navigate to the gear icon (settings), then click SNMP:
2. You will see the following **SNMP Configuration** dialog box:
3. Define a new user with appropriate PRIV Type and AUTH Type:

4. The Transport is UDP with port 161.
5. This user will be used in SolarWinds to connect to the Nutanix cluster.

**NOTE:** NOS 4.1.1 and above support only AES and SHA.
5.6.1 Add a Node to NPM

Now that the Nutanix Node View has been defined, you can associate this view with the Nutanix cluster to be monitored in Orion NPM.

- Open the Orion NPM Web Console and navigate to Home, then click Manage Nodes.

NOTE: NOS versions 4.1.2 + have an SNMP “sysObjectID” fix. It is now set to Nutanix “41263.” Prior to this fix, the “sysObjectID” was “8172” of net-snmp.

“Nutanix Inc.” will now show up as a top-level node, as represented in the following snapshot:
Click Add Node, as seen in the following snapshot:

The following dialog box allows you to define the node:

```
Define Node
Specify the node you want to add by completing the fields below. Are you adding a large number of nodes? Try the Network Discovery.

Polling Hostname or IP Address
IP4 and IP6 formats are both valid.

Polling Method:
- [Help me choose a polling method]
- [External Node: No Status] - No data is collected for this node. Useful for monitoring a hosted application or other wellness as the node is but not the node itself.
- [Status Only: ICMP] - Sends ping packets to test host ping and packet loss is collected using ICMP (ping), useful for devices which do not support SNMP or WMI.
- [Most Devices: SNMP and ICMP] - Standard polling method for network devices such as switches and routers, as well as Linux and Unix servers.

SNMP Version
SNMP V3
SNMP Port
161

SNMPv3 Credentials
SNMPv3 Username
mg
SNMPv3 Context

SNMPv3 Authentication
Method
SHA1
Password
Password is a key

SNMPv3 Privacy / Encryption
Method
AES128
Password
Password is a key

Credential Set Library
Name
Saved Credential Sets
Save
```

NOTE: Click Test to check the SNMP connection.

Ensure that the SNMP user credentials are the same as they are on the Nutanix cluster.

Click Next to choose resources.
Add Node

Choose Resource to monitor on NTNX-14SM15300008-B-CVM
Select the resources and statistics to monitor. The select menu provides shortcuts for selections.

```plaintext
Select:  ✔ All  ✗ None  ✔ All Volumes  ✔ All Interfaces  ✔ All Active Interfaces  ✗ No Interface Statistics

- ✔ Routing
  - ✔ Routing table
  - ✗ Topology Layer 3
- ✔ Status & Response Time
  - ✔ ICMP (Ping) - Fastest
  - ✗ SNMP
- ✔ CPU & Memory
- ✔ Volume Utilization
  - ✔ Physical memory
  - ✔ Virtual memory
  - ✔ Memory buffers
  - ✔ Cached memory
  - ✔ Swap space
  - ✗ /
  - ✗ /dev/shm
- ✔ /home
- ✔ /home/nutanix/data/stargate-storage/disks/BBTV416602H2400HGN
- ✔ /home/nutanix/data/stargate-storage/disks/0XG6LX23
- ✔ /home/nutanix/data/stargate-storage/disks/0XG6LY33
- ✔ /home/nutanix/data/stargate-storage/disks/0XG6LG9Q
- ✔ /home/nutanix/data/stargate-storage/disks/0XG6LMDM
- ✔ /lo
- ✔ /dev/eth0
- ✔ /dev/eth1
```
Click Next to add Pollers:

<table>
<thead>
<tr>
<th>Add UnDP Pollers to NTNXX-14SM15240030-A-CVM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select universal device pollers to add to node</td>
</tr>
<tr>
<td>☑ Example</td>
</tr>
<tr>
<td>☑ Nutanix Cluster Pollers</td>
</tr>
<tr>
<td>☑ clusterIops (Cluster wide average IO operations per second.)</td>
</tr>
<tr>
<td>☑ clusterLatency (Cluster wide average latency.)</td>
</tr>
<tr>
<td>☐ clusterName (Name of the cluster)</td>
</tr>
<tr>
<td>☑ clusterTotalStorageCapacity (Total storage capacity of the cluster in bytes.)</td>
</tr>
<tr>
<td>☑ clusterUsedStorageCapacity (Number of bytes of storage used on the cluster.)</td>
</tr>
<tr>
<td>☑ Nutanix Container Pollers</td>
</tr>
<tr>
<td>☑ ctiAvgLatencyUses (Average IO latency for this container in microseconds.)</td>
</tr>
<tr>
<td>☑ ctiContainerName (Name of the container)</td>
</tr>
<tr>
<td>☑ ctiOPPerSecond (Number of IO operations served per second from this container.)</td>
</tr>
<tr>
<td>☑ ctiTotalCapacity (Total capacity of the container in bytes.)</td>
</tr>
<tr>
<td>☑ ctiUsedCapacity (Number of bytes used in the container.)</td>
</tr>
<tr>
<td>☑ Nutanix CVM Pollers</td>
</tr>
<tr>
<td>☑ cvtControllerVMId (Nutanix Controller VM id.)</td>
</tr>
<tr>
<td>☑ cvtMemory (Total memory available on a CVM.)</td>
</tr>
<tr>
<td>☑ cvtNumCpus (Total number of CPUs allocated to a CVM.)</td>
</tr>
<tr>
<td>☑ Nutanix Disk Pollers</td>
</tr>
<tr>
<td>☑ dstControllerVMId (Nutanix Controller VM id.)</td>
</tr>
<tr>
<td>☑ dstDiskId (A unique disk id for each disk.)</td>
</tr>
<tr>
<td>☑ dstNumFreeBytes (Total number of bytes available to the non-root users on the device.)</td>
</tr>
<tr>
<td>☑ dstNumFreeInodes (Total number of inodes available to the non-root users on the device.)</td>
</tr>
<tr>
<td>☑ dstNumRawBytes (Maximum number of raw bytes available on the device.)</td>
</tr>
<tr>
<td>☑ dstNumTotalBytes (Total number of bytes usable on the device through its file system.)</td>
</tr>
<tr>
<td>☑ dstNumTotalInodes (Maximum number of inodes usable on the device through its file system.)</td>
</tr>
<tr>
<td>☑ dstSerial (Disk Serial Number)</td>
</tr>
<tr>
<td>☑ dstTemperature (Temperature of FIO disk in centigrade.)</td>
</tr>
<tr>
<td>☑ Nutanix Service Status Pollers</td>
</tr>
<tr>
<td>☑ sstControllerVMId (Nutanix Controller VM id.)</td>
</tr>
<tr>
<td>☑ sstControllerVMStatus (Status of the node.)</td>
</tr>
<tr>
<td>☑ Nutanix Storage Pool Pollers</td>
</tr>
<tr>
<td>☑ sspAvgLatencyUses (Average IO latency for this storage pool in microseconds.)</td>
</tr>
<tr>
<td>☑ sspOPPerSecond (Number of IO operations served per second from this storage pool.)</td>
</tr>
<tr>
<td>☑ sspStoragePoolName (Name of the storage pool.)</td>
</tr>
<tr>
<td>☑ sspTotalCapacity (Total capacity of the storage pool in bytes.)</td>
</tr>
<tr>
<td>☑ sspUsedCapacity (Number of bytes used in the storage pool.)</td>
</tr>
</tbody>
</table>

Click Next to move to the final step.
Click Ok, Add Node.

A message indicating that you have successfully added a node will appear, as seen below:
After the setup and configuration has been completed, users can view the node details in the web console.
5.6.2 Add Device by Type View

Navigate to Settings, click Views, then click Views by Device Type.

The following window will appear. Select Nutanix Node Details - Summary from the drop down menu for the object type, net-snmp, and click Submit.
Views for net-snmp and Nutanix device:

The Nutanix cluster with a NOS version earlier than 4.1.2 will show up as a “net-snmp” device. Navigate to Views by Device Type. Select the object type Nutanix, Inc” and click Submit.
6 Customize Table Views

The Nutanix clusters have been added and associated with the view. The table resources associated with the view can be made more meaningful by combining related columns into a unified table.

Navigate to the Nutanix Node Details – Summary view for the newly added Nutanix cluster.

Scroll down the Summary page until you see the Tabular Universal Device Poller Resource and click Edit.
1. Rename the Resource with a more contextually meaningful title.

2. Select the appropriate table columns from the available Poller Resources.
3. Select the rows of interest to display for this table resource.

4. Select the most appropriate column to use for a row label.

5. Click Yes for the Auto-Hide Resource, then click Submit.
6. Check to be sure that the newly formatted table is displayed as expected in the Nutanix Node Details View. Below is an example of a customized view for Container Table:

<table>
<thead>
<tr>
<th>Container Name</th>
<th>citAvgLatency</th>
<th>ciscosetIPerSecond</th>
<th>TotalCapacity</th>
<th>UsedCapacity</th>
<th>citContainerName - Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container Name1</td>
<td>1925</td>
<td>32</td>
<td>1072146531431495290575325485</td>
<td>ES-Container</td>
<td></td>
</tr>
<tr>
<td>Container Name2</td>
<td>1135</td>
<td>107</td>
<td>10721465314954062007672</td>
<td>Distributed_Setup_Production</td>
<td></td>
</tr>
<tr>
<td>Container Name3</td>
<td>2455</td>
<td>1</td>
<td>107214653149599140279471</td>
<td>GatewayServer_Production</td>
<td></td>
</tr>
<tr>
<td>Container Name4</td>
<td>2043</td>
<td>9</td>
<td>10721465314953271574807</td>
<td>DFS-Container</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: You can use similar steps to customize other tabular views for CVMs, storage pools, and disks.
7 Monitor a Nutanix Cluster: Snapshots

This section includes snapshots of a Nutanix cluster monitored by SolarWinds (configured using the process described above).

7.1 Nutanix UnDPs

The Nutanix UnDPs enable users to monitor objects published in the Nutanix MIB (see Appendix B), including clusters, Controller Virtual Machines (CVMs), containers, storage pools, and disks.

7.2 Snapshots
**Node Details**

<table>
<thead>
<tr>
<th>Node Status</th>
<th>Node is Up.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polling IP Address</td>
<td>10.4.40.173</td>
</tr>
<tr>
<td>Dynamic IP</td>
<td>No</td>
</tr>
<tr>
<td>Machine Type</td>
<td>net-snmp - Linux</td>
</tr>
<tr>
<td>DNS</td>
<td>angola-v1.eng.nutanix.com</td>
</tr>
<tr>
<td>System Name</td>
<td>NTNX-14SM152d0030-A-CVM</td>
</tr>
<tr>
<td>Description</td>
<td>Linux NTNX-14SM152d0030-A-CVM 2.6.32-558.23.2.el6.nutanix.x86_64 #1 SMP Thu Oct 31 14:20:23 PDT 2013 x86_64</td>
</tr>
<tr>
<td>Location</td>
<td>Unknown</td>
</tr>
<tr>
<td>Contact</td>
<td>root@localhost</td>
</tr>
<tr>
<td>SysObjectID</td>
<td>1.3.6.1.4.1.8072.8.2.10</td>
</tr>
<tr>
<td>Last Boot</td>
<td>Thursday, March 26, 2015 11:02 PM</td>
</tr>
<tr>
<td>Operating System</td>
<td>Unknown</td>
</tr>
<tr>
<td>IOS Image</td>
<td>Unknown</td>
</tr>
<tr>
<td>Hardware</td>
<td>Virtual, host unknown</td>
</tr>
<tr>
<td>No of CPUs</td>
<td>0</td>
</tr>
<tr>
<td>Telnet</td>
<td>telnet://10.4.40.173</td>
</tr>
<tr>
<td>Web Browse</td>
<td><a href="http://10.4.40.173">http://10.4.40.173</a></td>
</tr>
</tbody>
</table>

**NOTE:** NOS versions 4.1.2 + have an SNMP “sysObjectID” fix. It is now set to Nutanix “41263.” Prior to this fix, the “sysObjectID” was “8172” of net-snmp. “Nutanix Inc.” will now show up as a top-level node, as seen in the snapshot below:
The *Machine Type* will appear as Nutanix Inc.
Below is a snapshot of the Orion Universal Device Poller application, with defined Pollers and added clusters:

![Image of Orion Universal Device Poller interface]

- **Angola Cluster**
- **Backup**
- **Nutanix Inc.**
  - NTNX-143M12390002-CVM
  - NTNX-143D35400035-A/CVM
  - Puppet hood ESX

---

**All IP Addresses on Angola Cluster**

<table>
<thead>
<tr>
<th>IP Version</th>
<th>IP Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPv4</td>
<td>10.4.40.173 (polling IP)</td>
</tr>
<tr>
<td>IPv4</td>
<td>10.4.40.165</td>
</tr>
<tr>
<td>IPv4</td>
<td>192.168.5.2</td>
</tr>
<tr>
<td>IPv4</td>
<td>192.168.5.254</td>
</tr>
</tbody>
</table>

---

**clusterloop - Universal Device Poller Summary Chart**

![Image of clusterloop chart]
### Node Tabular Universal Device Poller

<table>
<thead>
<tr>
<th>Container Name</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container Name1</td>
<td>ES-Container</td>
</tr>
<tr>
<td>Container Name2</td>
<td>Distributed Setup Production</td>
</tr>
<tr>
<td>Container Name3</td>
<td>GatewayServer Production</td>
</tr>
<tr>
<td>Container Name4</td>
<td>DFS-Container</td>
</tr>
</tbody>
</table>

### Node Tabular Universal Device Poller

<table>
<thead>
<tr>
<th>Controller VM ID</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller VM ID1</td>
<td>1</td>
</tr>
<tr>
<td>Controller VM ID2</td>
<td>2</td>
</tr>
<tr>
<td>Controller VM ID3</td>
<td>3</td>
</tr>
</tbody>
</table>

### Node Tabular Universal Device Poller

<table>
<thead>
<tr>
<th>Controller VM Status</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller VM Status1</td>
<td>Up</td>
</tr>
<tr>
<td>Controller VM Status2</td>
<td>Down</td>
</tr>
<tr>
<td>Controller VM Status3</td>
<td>Up</td>
</tr>
</tbody>
</table>

### Node Tabular Universal Device Poller

<table>
<thead>
<tr>
<th>Storage Pool Latency</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Pool Latency1</td>
<td>471</td>
</tr>
</tbody>
</table>

### Node Tabular Universal Device Poller

<table>
<thead>
<tr>
<th>Storage Pool IOPS</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Pool IOPS1</td>
<td>240</td>
</tr>
</tbody>
</table>

### Node Tabular Universal Device Poller

<table>
<thead>
<tr>
<th>Storage Pool Name</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Pool Name1</td>
<td>ES-SP</td>
</tr>
</tbody>
</table>

### Node Tabular Universal Device Poller

<table>
<thead>
<tr>
<th>Storage Pool Total Capacity</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Pool Total Capacity1</td>
<td>10721445431490</td>
</tr>
</tbody>
</table>

### Node Tabular Universal Device Poller

<table>
<thead>
<tr>
<th>Storage Pool Used Capacity</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Pool Used Capacity1</td>
<td>2074751762492</td>
</tr>
</tbody>
</table>
8  Configure an SNMP Trap

The following are the key SNMP trap configuration steps:

1. Create an SNMP user on the Nutanix cluster (as defined in section 5.6)
2. Configure the Nutanix cluster (via Prism UI) to send traps to the SolarWinds system (the receiver of the traps).

Keep the following in mind as well:

o Nutanix supports only SNMP v3 traps. Please verify that the SolarWinds version supports SNMP v3. SNMP v3 traps were introduced in SolarWinds core version 2011.2 and higher.

o Ensure that the user credentials are configured correctly for both polling and traps. That is, be sure to use the same authentication type (auth, priv) for SNMP polling and traps.

o The traps were tested for NOS version 4.1.1; they may not work for NOS releases prior to 4.1.1.

8.1  Configuration on a Nutanix Cluster

The SNMP user and the receiver of the trap is configured as follows on the Nutanix cluster. This is done by using the Nutanix web console, Prism.

1. Navigate to the *gear icon* (settings), click *SNMP*. Add the user in Prism.

2. Select *Traps*.

3. Add *Traps*, click *New Trap*, and then enter the following details:
Configure SNMP transports, traps and users. You can enable or disable SNMP for the Nutanix software.

- **Enable SNMP**

### Transports - Users - Traps

**ADDRESS**

10.3.203.205

**PORT**

162

**ENGINE ID**


**INFORM**

- False

[Download MIB] [Cancel] [Save]

Scroll down for additional attributes:
Provide the input in the above screen as follows:

- **Address**: This should be the IP address of the machine where SolarWinds is installed.
- **Port**: 162 (Nutanix uses port 162 to send the traps).
- **Engine ID**: Leave this field blank.
- **Inform**: False.
- **Transport Protocol**: UDP.
- **Trap Username**: Select from the drop-down. This must be same as the user that is used to poll the devices in the SolarWinds Web Console.

After SNMP configuration is saved, Prism displays the engine ID for the Nutanix cluster.
8.2 Configuration on a SolarWinds NPM installation

This section describes the trap configuration needed on SolarWinds.

Note: Please ensure that the native Windows System SNMP Trap service is *not* running. SolarWinds has its own trap service.

Windows Service for traps:

1. Navigate to the Windows Control Panel. Click Administrative Tools, then click Services.
2. Stop the SNMP Trap service if it’s running.
3. Locate and start SolarWinds Trap Service.

Configuration in NPM:

The configuration needed to view SNMP traps in the Web Console is described in detail in the guide that can be accessed from the Help menu of the Orion Universal Device Poller application.
The key steps are reproduced below:

**Viewing SNMP Traps in the Web Console**

Customize the Traps view as shown in the following procedure.

**To view SNMP traps in the Web Console:**

1. Click **Start > All Programs > SolarWinds Orion > Orion Web Console**.
2. Click **Traps** in the Views toolbar.
3. If you want to filter your traps **table view by device**, select the device to which you want to limit your view in the **Network Object** field.
4. If you want to filter your traps **table by device type**, select the device types you want to view in the **Type of Device** field.
5. If you want to **limit your traps table to show only traps of a designated type**, select the appropriate type in the **Trap Type** field.
6. If you want to **limit your traps table to show only traps originating from a specific IP address**, type the IP Address in the **Source IP Address** field.
7. If you want to **limit your traps table to show only traps with a designated community string**, select the appropriate community string in the **Community String** field.
8. If you want to **limit your traps table to show only traps from a specific period of time**, select the time period from the **Time Period** menu.
9. Confirm the number of traps displayed in the **Show Traps** field.
10. Click **Refresh** to update the Traps view with your new settings.

**NOTE:** Traps from a 3.5.x cluster may not work properly. The following event message will be displayed:

⚠️ **Bad trap packet received from Node with IP 10.4.40.165. Error description: Unknown user and engine. Packet discarded**
8.3 An Example of a Trap

A sample trap can be generated on rebooting a CVM.

Log on to the CVM and reboot it:

Below is the trap received in SolarWinds from the above CVM reboot for a cluster named “Bach” running NOS version 4.1.2:

Refer to the MIB in Appendix B for the definition of a Nutanix Trap—their is only one OID (#991) for all Nutanix traps. The traps are distinguished by the message contents.
9 Conclusion

This user guide and the included Nutanix UnDPs provide a head start in using SolarWinds to monitor Nutanix clusters. The user may contact Nutanix support for further feedback and clarifications.

9.1 About Nutanix

Nutanix is the leader in hyper-converged infrastructure, natively converging compute and storage into a single, 100% software-driven solution to drive unprecedented simplicity at lower costs in the datacenter. Customers run any application, at any scale, with predictable performance and economics. Learn more at www.nutanix.com or follow up on Twitter @nutanix.
10 Appendix

10.1 Appendix A: References


10.2 Appendix B: The Nutanix MIB

The Nutanix MIB from the latest NOS 4.1.1 release is included below for reference.

```
NUTANIX-MIB DEFINITIONS ::= BEGIN
IMPORTS
    DisplayString
    FROM RFC1213-MIB
    enterprises, MODULE-IDENTITY, OBJECT-TYPE, Integer32, Counter64
    FROM SNMPv2-SMI
    TimeStamp
    FROM SNMPv2-TC;

nutanix MODULE-IDENTITY
    LAST-UPDATED "201302191930Z"
    ORGANIZATION "Nutanix Inc."
    CONTACT-INFO "support@nutanix.com"
    DESCRIPTION "Nutanix Cluster Management Information Base"
    REVISION "201302191930Z"
    DESCRIPTION "SNMP MIB for Nutanix Cluster software."
    ::= { enterprises 41263 }

    -- Cluster wide scalars starting from sub oid 501. This leaves room to add
    -- more table types in sequential oid order in future.
    --
    -- clusterName OBJECT-TYPE
    SYNTAX DisplayString (SIZE (0..255))
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION "Name of the cluster."
    ::= { nutanix 501 }

    clusterVersion OBJECT-TYPE
    SYNTAX DisplayString (SIZE (0..255))
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION "Current cluster version. This is the nutanix-core
        package version expected on all the Controller VMs."
    ::= { nutanix 502 }

    clusterStatus OBJECT-TYPE
    SYNTAX DisplayString (SIZE (0..255))
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION "Current Status of the cluster. This will usually be one of started or stopped"
    ::= { nutanix 503 }

    clusterTotalStorageCapacity OBJECT-TYPE
    SYNTAX Counter64
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION "Total storage capacity of the cluster in bytes."
    ::= { nutanix 504 }

    clusterUsedStorageCapacity OBJECT-TYPE
    SYNTAX Counter64
    ACCESS read-only
    STATUS mandatory
    DESCRIPTION "Number of bytes of storage used on the cluster."
```


clusterIops OBJECT-TYPE
SYNTAX Counter64
ACCESS read-only
STATUS mandatory
DESCRIPTION "Cluster wide average IO operations per second."

clusterLatency OBJECT-TYPE
SYNTAX Counter64
ACCESS read-only
STATUS mandatory
DESCRIPTION "Cluster wide average latency."

-- clusterThroughput OBJECT-TYPE
-- SYNTAX Counter64
-- ACCESS read-only
-- STATUS mandatory
-- DESCRIPTION "Cluster wide throughput."
-- ::= { nutanix 508 }
--
-- Nutanix SNMP table definitions.
--
-- Software version table
--
softwareVersionTable OBJECT-TYPE
SYNTAX SEQUENCE OF svtEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "Table of software versions for packages on all Controller VMs."
::= { nutanix 1 }

svtEntry OBJECT-TYPE
SYNTAX svtEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION "Software version table entry containing software versions on the Controller VMs."
INDEX { svtIndex }
::= { softwareVersionTable 1 }

svtEntry ::= SEQUENCE {
  svtIndex                  INTEGER,
  svtControllerVMId         Counter64,
  svtNutanixBootstrap       DisplayString,
  svtNutanixInfrastructure  DisplayString,
  svtNutanixCore            DisplayString,
  svtNutanixToolchain       DisplayString,
  svtNutanixServiceability  DisplayString,
  svtLinuxKernel            DisplayString
}

svtIndex OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION "Index for software version table entries."
::= { svtEntry 1 }

svtControllerVMId OBJECT-TYPE
SYNTAX Counter64
ACCESS read-only
STATUS mandatory
DESCRIPTION "Nutanix Controller VM Id."
::= { svtEntry 2 }

dsvtNutanixBootstrap OBJECT-TYPE
SYNTAX DisplayString (SIZE (0..255))
ACCESS read-only
STATUS mandatory
DESCRIPTION "The nutanix-bootstrap software package version."
::= { svtEntry 3 }

dsvtNutanixInfrastructure OBJECT-TYPE
SYNTAX DisplayString (SIZE (0..255))
ACCESS read-only
STATUS mandatory
DESCRIPTION "The nutanix-infrastructure software package version."
::= { svtEntry 4 }
svtNutanixCore OBJECT-TYPE
SYNTAX DisplayString (SIZE (0..255))
ACCESS read-only
STATUS mandatory
DESCRIPTION "The nutanix-core software package version."
::= { svtEntry 5 }
svtNutanixToolchain OBJECT-TYPE
SYNTAX DisplayString (SIZE (0..255))
ACCESS read-only
STATUS mandatory
DESCRIPTION "The nutanix-toolchain software package version."
::= { svtEntry 6 }
svtNutanixServiceability OBJECT-TYPE
SYNTAX DisplayString (SIZE (0..255))
ACCESS read-only
STATUS mandatory
DESCRIPTION "The nutanix-serviceability software package version."
::= { svtEntry 7 }
svtLinuxKernel OBJECT-TYPE
SYNTAX DisplayString (SIZE (0..255))
ACCESS read-only
STATUS mandatory
DESCRIPTION "The linux kernel version currently installed."
::= { svtEntry 8 }

-- Service status table
--
serviceStatusTable OBJECT-TYPE
SYNTAX SEQUENCE OF sstEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "Table of status of each service with one row per Controller VM."
::= { nutanix 2 }
sstEntry OBJECT-TYPE
SYNTAX sstEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION "Table entry containing status of services on one node."
INDEX { sstIndex }
::= { serviceStatusTable 1 }

sstEntry ::= SEQUENCE {
  sstIndex INTEGER,
  sstControllerVMId Counter64,
  sstControllerVMStatus DisplayString,
  sstZeusStatus DisplayString,
  sstScavengerStatus DisplayString,
  sstMedusaStatus DisplayString,
  sstPithosStatus DisplayString,
  sstStargateStatus DisplayString,
  sstChronosStatus DisplayString,
  sstCuratorStatus DisplayString,
  sstPrismStatus DisplayString,
  sstAlertManagerStatus DisplayString,
  sstStatsAggregatorStatus DisplayString,
  sstSysStatCollectorStatus DisplayString
}
sstIndex OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION "A unique index for each row in the service status table."
::= { sstEntry 1 }
sstControllerVMId OBJECT-TYPE
SYNTAX Counter64
ACCESS read-only
STATUS mandatory
DESCRIPTION "Nutanix Controller VM Id."
::= { sstEntry 2 }
sstControllerVMStatus OBJECT-TYPE
SYNTAX  DisplayString (SIZE (0..255))
ACCESS  read-only
STATUS  mandatory
DESCRIPTION  “Status of the node.”
::= { sstEntry 3 }
sstZeusStatus OBJECT-TYPE
SYNTAX  DisplayString (SIZE (0..255))
ACCESS  read-only
STATUS  mandatory
DESCRIPTION  “Status of Zeus on the node. A comma separated list of pids of the zeus service.”
::= { sstEntry 4 }
sstScavengerStatus OBJECT-TYPE
SYNTAX  DisplayString (SIZE (0..255))
ACCESS  read-only
STATUS  mandatory
DESCRIPTION  “Status of Scavenger on the node. A comma separated list of pids of the scavenger service.”
::= { sstEntry 5 }
sstMedusaStatus OBJECT-TYPE
SYNTAX  DisplayString (SIZE (0..255))
ACCESS  read-only
STATUS  mandatory
DESCRIPTION  “Status of Medusa on the node. A comma separated list of pids of the medusa service.”
::= { sstEntry 6 }
sstPithosStatus OBJECT-TYPE
SYNTAX  DisplayString (SIZE (0..255))
ACCESS  read-only
STATUS  mandatory
DESCRIPTION  “Status of Pithos on the node. A comma separated list of pids of the pithos service.”
::= { sstEntry 7 }
sstStargateStatus OBJECT-TYPE
SYNTAX  DisplayString (SIZE (0..255))
ACCESS  read-only
STATUS  mandatory
DESCRIPTION  “Status of Stargate on the node. A comma separated list of pids of the stargate service.”
::= { sstEntry 8 }
sstChronosStatus OBJECT-TYPE
SYNTAX  DisplayString (SIZE (0..255))
ACCESS  read-only
STATUS  mandatory
DESCRIPTION  “Status of Chronos on the node. A comma separated list of pids of the chronos service.”
::= { sstEntry 9 }
sstCuratorStatus OBJECT-TYPE
SYNTAX  DisplayString (SIZE (0..255))
ACCESS  read-only
STATUS  mandatory
DESCRIPTION  “Status of Curator on the node. A comma separated list of pids of the curator service.”
::= { sstEntry 10 }
sstPrismStatus OBJECT-TYPE
SYNTAX  DisplayString (SIZE (0..255))
ACCESS  read-only
STATUS  mandatory
DESCRIPTION  “Status of Prism on the node. A comma separated list of pids of the prism service.”
::= { sstEntry 11 }
sstAlertManagerStatus OBJECT-TYPE
SYNTAX  DisplayString (SIZE (0..255))
ACCESS  read-only
STATUS  mandatory
DESCRIPTION  “Status of Alert Manager on the node. A comma separated list of pids of the alert manager service.”
::= { sstEntry 12 }
sstStatsAggregatorStatus OBJECT-TYPE
SYNTAX  DisplayString (SIZE (0..255))
ACCESS  read-only
STATUS  mandatory
DESCRIPTION  “Status of Stats Aggregator on the node. A comma separated list of pids of the stats aggregator service.”
::= { sstEntry 13 }
sstSysStatCollectorStatus OBJECT-TYPE
**SYNTAX**  DisplayString {SIZE [0..255]}  
**ACCESS**  read-only  
**STATUS**  mandatory  
**DESCRIPTION**  “Status of SysStatCollector on the node. A comma separated list of pids of the sys stat collector service.”  
::= { sstEntry 14 }  
--  
-- Disk Status Table  
--  
diskStatusTable OBJECT-TYPE  
SYNTAX  SEQUENCE OF dstEntry  
MAX-ACCESS  not-accessible  
STATUS  current  
**DESCRIPTION**  “Table provides disk status on all CVMs.”  
::= { nutanix 3 }  
dstEntry OBJECT-TYPE  
SYNTAX  dstEntry  
**ACCESS**  not-accessible  
**STATUS**  mandatory  
**DESCRIPTION**  “Table entry containing status of a disk on a CVM.”  
INDEX { dstIndex }  
::= { diskStatusTable 1 }  
dstEntry := SEQUENCE {  
dstIndex  INTEGER,  
dstDiskId  Counter64,  
dstControllerVMId  Counter64,  
dstSerial  DisplayString,  
dstNumRawBytes  Counter64,  
dstNumTotalBytes  Counter64,  
dstNumFreeBytes  Counter64,  
dstNumTotalInodes  Counter64,  
dstNumFreeInodes  Counter64,  
dstTemperature  INTEGER  
}  
dstIndex OBJECT-TYPE  
SYNTAX  INTEGER  
**ACCESS**  read-only  
**STATUS**  mandatory  
**DESCRIPTION**  “A unique index for each row in the disk status table.”  
::= { dstEntry 1 }  
dstDiskId OBJECT-TYPE  
SYNTAX  Counter64  
**ACCESS**  read-only  
**STATUS**  mandatory  
**DESCRIPTION**  “A unique disk id for each disk.”  
::= { dstEntry 2 }  
dstControllerVMId OBJECT-TYPE  
SYNTAX  Counter64  
**ACCESS**  read-only  
**STATUS**  mandatory  
**DESCRIPTION**  “Nutanix Controller VM Id.”  
::= { dstEntry 3 }  
dstSerial OBJECT-TYPE  
SYNTAX  DisplayString {SIZE [0..255]}  
**ACCESS**  read-only  
**STATUS**  mandatory  
**DESCRIPTION**  “Disk Serial Number”  
::= { dstEntry 4 }  
dstNumRawBytes OBJECT-TYPE  
SYNTAX  Counter64  
**ACCESS**  read-only  
**STATUS**  mandatory  
**DESCRIPTION**  “Maximum number of raw bytes available on the device.”  
::= { dstEntry 5 }  
dstNumTotalBytes OBJECT-TYPE  
SYNTAX  Counter64  
**ACCESS**  read-only  
**STATUS**  mandatory  
**DESCRIPTION**  “Total number of bytes usable on the device through its file system.”  
::= { dstEntry 6 }
dstNumFreeBytes OBJECT-TYPE
SYNTAX Counter64
ACCESS read-only
STATUS mandatory
DESCRIPTION "Total number of bytes available to the non-root users on the device through its file system."
::= { dstEntry 7 }
dstNumTotalInodes OBJECT-TYPE
SYNTAX Counter64
ACCESS read-only
STATUS mandatory
DESCRIPTION "Maximum number of inodes usable on the device through its file system."
::= { dstEntry 8 }
dstNumFreeInodes OBJECT-TYPE
SYNTAX Counter64
ACCESS read-only
STATUS mandatory
DESCRIPTION "Total number of inodes available to the non-root users on the device through its file system."
::= { dstEntry 9 }
dstTemperature OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION "Temperature of FIO disk in centigrade."
::= { dstEntry 10 }

Controller VM resource table.

controllerVMResourceTable OBJECT-TYPE
SYNTAX SEQUENCE OF crtEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "Table of resources per Controller VM."
::= { nutanix 4 }
crtEntry OBJECT-TYPE
SYNTAX crtEntry
ACCESS not-accessible
STATUS mandatory
DESCRIPTION "Table entry containing resource information of one Controller VM."
INDEX { crtIndex }
::= { controllerVMResourceTable 1 }
crtEntry ::= SEQUENCE {
crtIndex INTEGER,
crtControllerVMId Counter64,
crtMemory Counter64,
crtNumCpus INTEGER
}
crtIndex OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION "A unique index for each row in the CVM memory table."
::= { crtEntry 1 }
crtControllerVMId OBJECT-TYPE
SYNTAX Counter64
ACCESS read-only
STATUS mandatory
DESCRIPTION "Nutanix Controller VM Id."
::= { crtEntry 2 }
crtMemory OBJECT-TYPE
SYNTAX Counter64
ACCESS read-only
STATUS mandatory
DESCRIPTION "Total memory available on a CVM."
::= { crtEntry 3 }
crtNumCpus OBJECT-TYPE
SYNTAX INTEGER
ACCESS read-only
STATUS mandatory
DESCRIPTION "Total number of CPUs allocated to a CVM."
::= { crtEntry 4 }
Storage pool information table.

storagePoolInformationTable OBJECT
  SYNTAX SEQUENCE OF spitEntry
  MAX-ACCESS not-accessible
  STATUS current
  DESCRIPTION "Storage pool information in a table form."
  ::= { nutanix 7 }

spitEntry OBJECT-TYPE
  SYNTAX spitEntry
  ACCESS not-accessible
  STATUS mandatory
  DESCRIPTION "Storage pool information table entry."
  INDEX { spitIndex }
  ::= { storagePoolInformationTable 1 }
spitEntry ::= SEQUENCE {
  spitIndex            INTEGER,
  spitStoragePoolId    Counter64,
  spitStoragePoolName  DisplayString,
  spitTotalCapacity    Counter64,
  spitUsedCapacity     Counter64,
  spitIOPerSecond      INTEGER,
  spitAvgLatencyUsecs  Counter64
}

spitIndex OBJECT-TYPE
  SYNTAX INTEGER
  ACCESS read-only
  STATUS mandatory
  DESCRIPTION "Unique index for storage pool information table entries."
  ::= { spitEntry 1 }

spitStoragePoolId OBJECT-TYPE
  SYNTAX Counter64
  ACCESS read-only
  STATUS mandatory
  DESCRIPTION "Storage pool id."
  ::= { spitEntry 2 }

spitStoragePoolName OBJECT-TYPE
  SYNTAX DisplayString (SIZE (0..255))
  ACCESS read-only
  STATUS mandatory
  DESCRIPTION "Name of the storage pool."
  ::= { spitEntry 3 }

spitTotalCapacity OBJECT-TYPE
  SYNTAX Counter64
  ACCESS read-only
  STATUS mandatory
  DESCRIPTION "Total capacity of the storage pool in bytes."
  ::= { spitEntry 4 }

spitUsedCapacity OBJECT-TYPE
  SYNTAX Counter64
  ACCESS read-only
  STATUS mandatory
  DESCRIPTION "Number of bytes used in the storage pool."
  ::= { spitEntry 5 }

spitIOPerSecond OBJECT-TYPE
  SYNTAX INTEGER
  ACCESS read-only
  STATUS mandatory
  DESCRIPTION "Number of IO operations served per second from this storage pool."
  ::= { spitEntry 6 }

spitAvgLatencyUsecs OBJECT-TYPE
  SYNTAX Counter64
  ACCESS read-only
  STATUS mandatory
  DESCRIPTION "Average IO latency for this storage pool in microseconds."
  ::= { spitEntry 7 }

-- Container information table
containerInformationTable OBJECT-TYPE
SYNTAX        SEQUENCE OF citEntry
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION   "Container information in a table form."
 ::= { nutanix 8 }

citEntry OBJECT-TYPE
SYNTAX        citEntry
ACCESS        not-accessible
STATUS        mandatory
DESCRIPTION   "Container information table entry."
INDEX         { citIndex }
 ::= { containerInformationTable 1 }
citEntry ::= SEQUENCE {
citIndex             INTEGER,
citContainerId       Counter64,
citContainerName     DisplayString,
citTotalCapacity     Counter64,
citUsedCapacity      Counter64,
citIOPerSecond       INTEGER,
citAvgLatencyUsecs   Counter64
}
citIndex OBJECT-TYPE
SYNTAX        INTEGER
ACCESS        read-only
STATUS        mandatory
DESCRIPTION   "Unique index for container information table entries."
 ::= { citEntry 1 }
citContainerId OBJECT-TYPE
SYNTAX        Counter64
ACCESS        read-only
STATUS        mandatory
DESCRIPTION   "Container id."
 ::= { citEntry 2 }
citContainerName OBJECT-TYPE
SYNTAX        DisplayString (SIZE (0..255))
ACCESS        read-only
STATUS        mandatory
DESCRIPTION   "Name of the container."
 ::= { citEntry 3 }
citTotalCapacity OBJECT-TYPE
SYNTAX        Counter64
ACCESS        read-only
STATUS        mandatory
DESCRIPTION   "Total capacity of the container in bytes."
 ::= { citEntry 4 }
citUsedCapacity OBJECT-TYPE
SYNTAX        Counter64
ACCESS        read-only
STATUS        mandatory
DESCRIPTION   "Number of bytes used in the container."
 ::= { citEntry 5 }
citIOPerSecond OBJECT-TYPE
SYNTAX        INTEGER
ACCESS        read-only
STATUS        mandatory
DESCRIPTION   "Number of IO operations served per second from this container."
 ::= { citEntry 6 }
citAvgLatencyUsecs OBJECT-TYPE
SYNTAX        Counter64
ACCESS        read-only
STATUS        mandatory
DESCRIPTION   "Average IO latency for this container in microseconds."
 ::= { citEntry 7 }
--
-- Abstract alert object.
-- All alert data to be sent in a trap is grouped within this object. This
-- allows alert objects to appear grouped together in certain graphical MIB
-- viewers.
--
-- ntxAlert OBJECT IDENTIFIER ::= {nutanix 999}
10.3 Appendix C: Nutanix EULA

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5. RESTRICTIONS Except as otherwise expressly permitted in this Agreement, and in addition to any other restrictions herein, You may not (i) modify or create any derivative works of the Product, including translation or localization; (ii) decompile, unbundle, disassemble or reverse engineer the Product, or attempt to derive the source code for the Product (except to the extent applicable laws specifically prohibit such restriction); (iii) redistribute, encumber, sell, rent, lease, sublicense, use the Products in a timesharing or service bureau arrangement, or otherwise transfer rights to the Product; (iv) copy the Product (except for an archival copy which must be stored on media other than a computer hard drive and which must be returned to Nutanix at the expiration of this Agreement) or its documentation; (v) remove or alter any trademark, logo, copyright or other proprietary notices, legends, symbols or labels in or on the Product; (vi) modify any header
files or class libraries in the Product; (vii) publish any results of benchmark tests run on the Product or disclose Product features, errors or bugs to a third party without Nutanix’s prior written consent; (viii) use the Product for any purpose other than internal testing purposes; or (ix) use the Product in any manner after the date of first commercial availability for that particular Product.

6. **CONFIDENTIALITY** “Confidential Information” means all information disclosed by one party to the other party (a) in tangible form and which is marked or otherwise designated as “Confidential” or “Proprietary”; (b) disclosed orally, and summarized promptly in writing and delivered to the other party; or (c) which by the nature of the information and the circumstances of the disclosure the receiving party should reasonably infer to be confidential or proprietary. “Confidential Information” does not include information which: (a) is or becomes generally known through no fault of the receiving party; (b) is known to the receiving party at the time of disclosure, as evidenced by its records; (c) is hereafter furnished to the receiving party by a third party as a matter of right and without restriction on disclosure; (d) is independently developed by the receiving party without any breach of this Agreement; (e) is in response to a valid order of a court or other governmental body or is otherwise required by law to be disclosed, provided the responding party gives sufficient notice to the other party to enable it to take protective measures; or, (f) is otherwise necessary to establish rights or enforce obligations under this Agreement, but only to the extent that any such disclosure is necessary. You acknowledge that the Product, its existence, its features, its capacities, its capabilities, its thresholds, its limitations, and mode of operation, any related materials provided by Nutanix, including this Agreement, the beta test results compiled by You, and other technical, business, product, marketing, plans, and data relating to the Product and Nutanix are Confidential Information of Nutanix. You agree (i) to hold the Confidential Information in strict confidence, (ii) not to disclose any Confidential Information to any third parties, and (iii) not to use any Confidential Information for any purpose except the purposes of this Agreement. You may disclose Confidential Information to employees who have a need to know such Confidential Information, and then only to the extent necessary to carry out testing under this Agreement. You will have executed or shall execute appropriate written agreements with your employees to enable You to comply with the provisions of this Agreement.

7. **ROADMAP** Nutanix may disclose information related to its development and plans for future products, features or enhancements (“Roadmap”). Roadmap information is subject to change at any time, without notice. Nutanix provides no assurances, and assumes no responsibility, that future products, features or enhancements will be introduced. You acknowledge that: a) purchasing decisions are not being made based upon reliance of timeframes or specifics outlined in the Roadmap, and b) purchasing decisions would not be affected if Nutanix delays or never introduces the future products, features or enhancements. Nutanix reserves the right at any time not to release a commercial version of the Product or, if released, to alter prices, features, licensing terms, or other characteristics of the commercial release.

8. **DISCLAIMER OF WARRANTY** THE PRODUCT IS PROVIDED TO YOU FREE OF CHARGE, AND ON AN “AS-IS” BASIS. NUTANIX PROVIDES NO TECHNICAL SUPPORT, WARRANTIES OR REMEDIES FOR THE PRODUCT. NUTANIX AND ITS SUPPLIERS DISCLAIM ALL EXPRESS, IMPLIED OR STATUTORY WARRANTIES RELATING TO THE PRODUCT, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, AND NONINFRINGEMENT. NUTANIX DOES NOT WARRANT THAT USE OF THE PRODUCT WILL BE UNINTERRUPTED OR ERROR-FREE, THAT DEFECTS WILL BE CORRECTED, OR THAT THE PRODUCT IS FREE OF VIRUSES OR OTHER HARMFUL COMPONENTS. IF APPLICABLE LAW REQUIRES ANY WARRANTIES WITH RESPECT TO THE PRODUCT, ALL SUCH WARRANTIES ARE LIMITED IN DURATION TO NINETY (90) DAYS FROM THE DATE OF PRODUCT INSTALLATION.

THE PRODUCT LICENSED HEREUNDER MAY CONTAIN DEFECTS AND A PRIMARY PURPOSE OF THIS TESTING LICENSE IS TO OBTAIN FEEDBACK ON SOFTWARE PERFORMANCE AND THE IDENTIFICATION OF DEFECTS. YOU IS ADVISED TO SAFEGUARD IMPORTANT DATA, TO
USE CAUTION AND NOT TO RELY IN ANY WAY ON THE CORRECT FUNCTIONING OR PERFORMANCE OF THE PRODUCT AND/OR ACCOMPANYING MATERIALS.

9. **LIMITATION OF LIABILITY** TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT WILL NUTANIX OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PRODUCT, INCLUDING WITHOUT LIMITATION, DAMAGES FOR LOSS OF GOODWILL, LOSS OF PROFITS, WORK STOPPAGE, DATA LOSS OR DATA CORRUPTION, COMPUTER FAILURE OR MALFUNCTION, OR ANY AND ALL OTHER COMMERCIAL DAMAGES OR LOSSES, EVEN IF ADVISED OF THE POSSIBILITY THEREOF, AND REGARDLESS OF THE LEGAL OR EQUITABLE THEORY (CONTRACT, TORT OR OTHERWISE) UPON WHICH THE CLAIM IS BASED. TO THE MAXIMUM EXTENT PERMITTED BY LAW, NUTANIX’S AGGREGATE CUMULATIVE LIABILITY HEREUNDER SHALL NOT EXCEED THE GREATER OF ONE THOUSAND DOLLARS ($1,000.00). NUTANIX IS NOT RESPONSIBLE FOR ANY LIABILITY ARISING OUT OF ANY DATA OR CONTENT PROVIDED BY YOU OR A THIRD PARTY.

10. **EXPORT CONTROL** You understand that the Product may be subject to export control laws and regulations. YOU MAY NOT DOWNLOAD OR OTHERWISE EXPORT OR RE-EXPORT PRODUCT(S) OR ANY UNDERLYING INFORMATION OR TECHNOLOGY, EVEN IF TO DO SO WOULD BE ALLOWED UNDER THIS AGREEMENT, EXCEPT IN STRICT COMPLIANCE WITH ALL UNITED STATES AND OTHER APPLICABLE LAWS AND REGULATIONS. Without limiting the foregoing, Product(s) may not be shipped, downloaded or otherwise exported or re-exported (i) into, or to a national or resident of any country to which the U.S. has embargoed goods; or (ii) to anyone on the U.S. Treasury Department’s list of Specially Designated Nationals, Specially Designated Terrorists, or Specially Designated Narcotic Traffickers, or otherwise on the U.S. Commerce Department’s Table of Denial Orders.

11. **U.S. GOVERNMENT END USERS** The Product is a “commercial item,” as that term is defined in 48 C. F. R. 2.101 (Oct. 1995), consisting of “commercial computer software,” “commercial computer hardware” and “commercial computer software documentation” as such terms are used in 48 C. F. R. 12.212 (Sept. 1995). Consistent with 48 C. F. R. 12.212 and 48 C. F. R. 227.7202-1 through 227.7202-4 (June 1995), all U.S. Government End Users acquire the Product with only those rights set forth in this Agreement.

12. **MISCELLANEOUS** Neither the rights nor the obligations arising under this Agreement are assignable by You, and any such attempted assignment or transfer shall be void and without effect. This Agreement shall be governed by and construed in accordance with the laws of the State of California and the United States without regard to the conflict of laws provisions therein that would require application of the laws of another jurisdiction. Any action under or relating to this Agreement shall be brought solely in the state and federal courts located in California, with sole venue in the courts located in Santa Clara County and each party hereby submits to the personal jurisdiction of such courts, except that Nutanix may seek relief in any court of competent jurisdiction to protect or enforce its intellectual property and proprietary rights. The United Nations Convention on Contracts for the International Sale of Goods shall not apply to this Agreement. In the event that any provision of this Agreement is found to be contrary to law, then such provision shall be construed as nearly as possible to reflect the intention of the parties, with the other provisions remaining in full force and effect. Any notice to You may be provided by email. This Agreement constitutes the entire agreement between the parties pertaining to the subject matter hereof, and any and all written or oral agreements previously existing between the parties are expressly canceled. Except as otherwise expressly provided in this Agreement, any modifications of this Agreement must be in writing and agreed to by both parties.