



Technical Report

OnCommand Unified Manager 7.2: Best Practices Guide

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Abstract

NetApp® OnCommand® Unified Manager 7.2 is the most comprehensive product for managing and monitoring NetApp ONTAP® systems. The need to support various installation platforms, infrastructure scalability, and deployment scenarios creates such a complex list of requirements that one configuration might not fit all. This document outlines basic deployment and best practice guidelines for NetApp OnCommand Unified Manager 7.2. The document is for users who are already familiar with the fundamentals of the ONTAP operating system and OnCommand Unified Manager.

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1 Introduction

NetApp OnCommand Unified Manager (OCUM) 7.2 is the most comprehensive product for managing and monitoring performance, capacity, and health in ONTAP® systems through features like events, alerts, performance troubleshooting, capacity reporting, and more. With OnCommand Unified Manager 7.2, Unified Manager and Performance Manager are available in a single download and a single server.

Because performance monitoring is now fully integrated into the Unified Manager product, OnCommand Performance Manager (OPM) is no longer available as a separate product. NetApp provides a migration tool to copy the historical performance data from OPM 7.1 to OCUM 7.2. For more information, read the technical report [Migrating Performance Data to NetApp OnCommand Unified Manager 7.2](#).

The purpose of this guide is to inform you about all the design questions you may need to consider in building an OnCommand Unified Manager 7.2 instance. Especially if you have a large ONTAP footprint, proper planning of Unified Manager deployments is essential to help you to scale later.

2 Architecture

OnCommand Unified Manager 7.2 gives you a single installer. Health and performance data are collected into a single unified MySQL database, and health and performance events can be configured from the same interface. Also, you can add user-defined performance alerts from the Unified Manager Alert tab. And you need to maintain only one SSL certificate for connecting to ONTAP clusters.

On a high level, OnCommand Unified Manager 7.2 software consists of the following four main components:

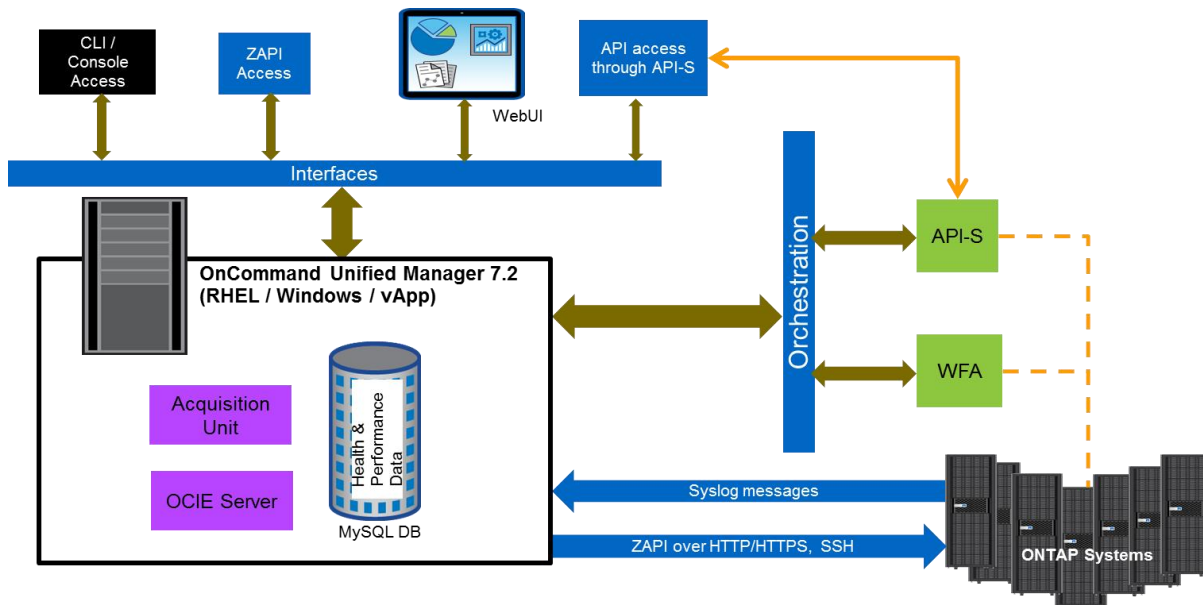
Acquisition unit. Collects and normalizes configuration, capacity, and performance statistics from ONTAP systems and sends each collected information set to the OCIE server.

OCIE server. Writes the collected ONTAP information into the database. Also provides public interfaces to retrieve the data via EJBs (Enterprise JavaBeans) and sends notifications to listening parties when collections have completed.

Unified Manager Health and Performance. These components heuristically monitor and analyze all the capacity, protection, and performance based features of the monitored ONTAP systems and provide the customer with visible events, alerts, and reports.

Unified Manager UI. This component presents a friendly, easy-to-use interface for all the features of OCUM and the ONTAP systems.

Figure 1) OnCommand Unified Manager 7.2 architecture.



3 Installation Guidelines

Organizations have requirements for certifying software versions and security updates in their environment. These requirements may force you to decide on a platform to host your software. Before you start a fresh installation of OnCommand Unified Manager 7.2, you must decide on the platform (vApp, Red Hat Enterprise Linux, or Windows) that best suits your environment.

3.1 Selecting the Right Platform

Organizations have different security procedures, patching policies, and regulations that limit the way a product is installed. With OnCommand Unified Manager, you have the flexibility to install your Unified Manager instance in the platform that best suits your organizational needs. Although there is no significant performance, operational, or functional differences among the three platforms, you should understand how your platform selection affects your operations:































With the **virtual appliance (vApp) distribution**, the underlying operating system is locked down behind a network firewall. There is no user access to the file system or to the operating system components. Any updates to the software must be applied via a patch downloaded from the NetApp Support site. Scale may be limited by VMWare’s CPU and RAM allocation capability. vApp is an excellent choice for customers who have less need for independent verification and control of software components. Deployments are up and running in a matter of minutes.

With the **Red Hat Enterprise Linux distribution**, the customer retains control of the operating system. Any required agents (such as backup, auditing, and so on) can be installed, and the customer is free to choose the patch levels for third-party software packages used by Unified Manager, such as Java and MySQL. Customers can also patch the server on their schedule. Additional security hardening is possible if it doesn’t interfere with required network connections. This is a great option for customers who have very specific corporate security requirements.

With the **Windows distribution**, customers fully control the Windows server and the environment. They can patch the server and choose to change the versions of third-party components. However, the process is not as simple as on Linux.

Use Table 1 in deciding which platform to select.

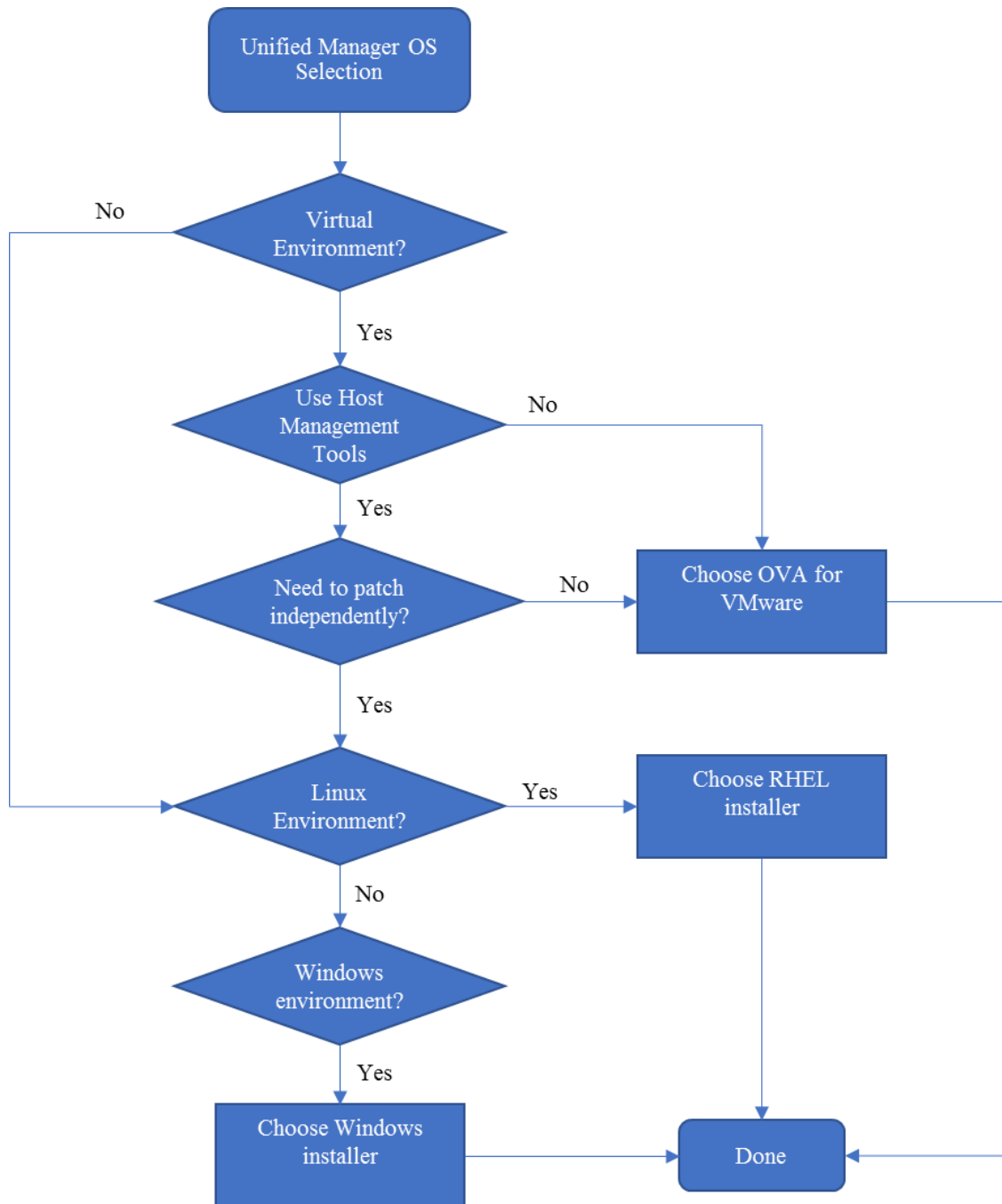
Table 1) Choosing the right platform.

Functional Requirement	vApp	Windows (Guest OS)	Red Hat (Guest OS)	Windows (Physical)	Red Hat (Physical)
Platform hosting Unified Manager requires regular patching in your environment.					
Platform hosting Unified Manager requires OS hardening.					
Unified Manager requires a certain software component version. For example, MySQL version 5.7.18 is required but the built-in package in vApp (OVA) is currently 5.7.17.					
Unified Manager instance needs to scale up its resources (memory, disk space) to satisfy new nodes or clusters being added.					
You have delegated management roles in your environment for operations and administrative roles.					
You expect to have a higher node count, requiring you to scale Unified Manager instance vertically.					

* You cannot auto-scale resources in physical servers directly. You can add resources (memory and disk) only during downtime, provided that your hardware supports extra DIMM and disk slots.

Alternatively, you can use the logic shown in Figure 2 to identify the right platform.

Figure 2) Identifying the right platform.



3.2 Resource Allocation

With OnCommand Unified Manager 7.2, there are no reservations on CPU, memory, and disk requirements, which means that the installation is not going to fail because it does not meet the 150GB disk space recommendation. Follow the sizing recommendations in Section 4.

3.3 Planning Your MySQL (/opt/netapp/data) Space

With increasing business needs, your OnCommand Unified Manager 7.2 instance will need to scale vertically to monitor and manage additional storage infrastructure. Increasing object counts result in additional space requirements in the /opt/netapp/data space, requiring a flexible /opt/netapp/data partition that can grow with new resource requirements. You may also have to plan for additional space for backups, because the partition is homed under /opt/netapp/data. For these reasons, your /opt/netapp/data space needs to be flexible to allow expansion. NetApp recommends:

- For RHEL and Windows installations: /opt/netapp/data mounted from a LUN for physical installations.
- For vApp installations: Rely on the datastore where MySQL database is hosted from.

Note: For large MySQL databases, you can plan on keeping the support bundles in a different location than /opt/netapp/data. This will prevent unnecessary space consumption in the /opt/netapp/data space.

To enable your MySQL DB data (/opt/netapp/data) to auto-expand, NetApp recommends having a volume manager manage your LUN mount. Requirements for the different platforms are discussed in the rest of this section.

3.3.1 Red Hat Enterprise Linux

NetApp recommends mounting /opt/netapp/data from a LUN mount for Unified Manager and to use a volume manager to mount it as a filesystem in your host. This gives you the flexibility of adding LUNs for additional disk space while keeping the /opt/netapp/data mount constant. You can add multiple LUNs under the same mount point with the help of logical expansion.

If you need to increase /opt/netapp/data for an existing Unified Manager 7.2 instance that is installed on /opt/netapp/data mounted locally, follow these steps:

1. Install an iSCSI adapter in your Linux server.
2. Create a new LUN and map it to the Unified Manager server.
3. Use LVM or a similar volume manager to mount the LUN.
4. Shut down the Unified Manager 7.2 instance and then copy the entire contents of /opt/netapp/data into the new mountpoint.
5. After copying is completed, rename the new mountpoint as /opt/netapp/data and bring up the Unified Manager 7.2 services again.

Plan to mount /opt/netapp/data from separate LUN and mount it with a volume manager. This gives you flexibility in granting additional /opt/netapp/data space by using volume managers like Linux native LVM. You can add multiple LUNs under the same mount point with the help of logical expansion.

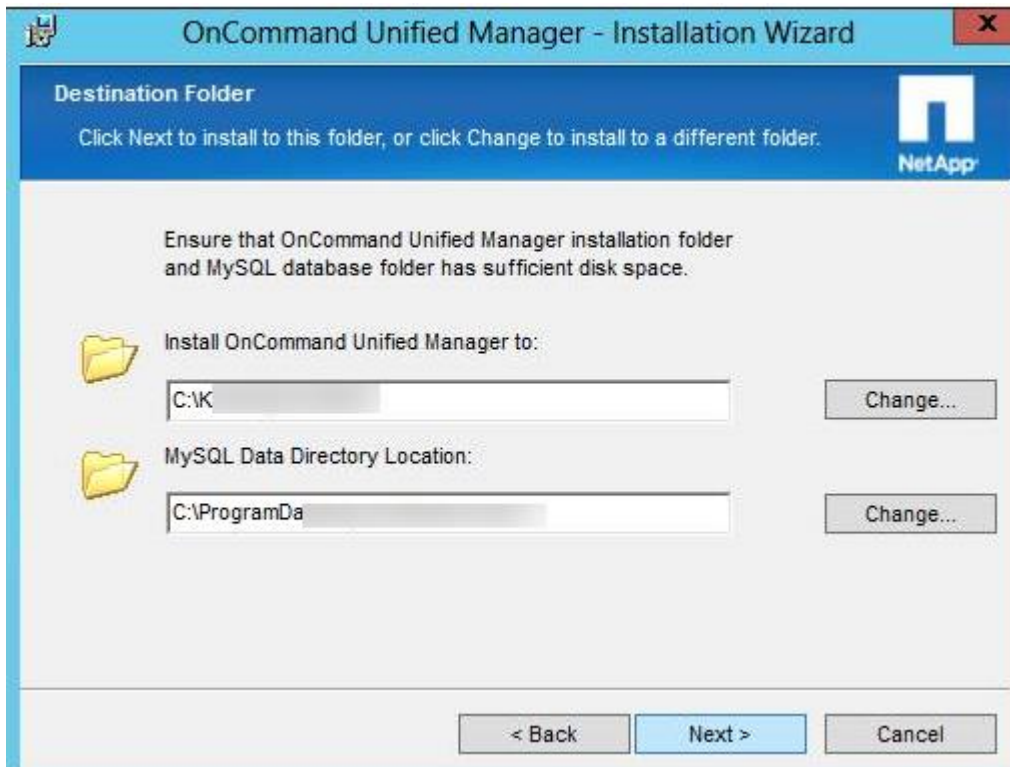
3.3.2 Windows

Always plan to put your Unified Manager data directory in a non-system drive (if your system drive is C drive, do not use C drive for MySQL data); you cannot expand your system drive. NetApp recommends mounting a LUN for placing your MySQL data and making the disk dynamic for future expansions as the need increases.

Alternatively, you can have a volume manager offer a non-system drive; you can always add space to this drive for future expansion.

During installation, you can specify where you want to keep MySQL data, as shown in Figure 3.

Figure 3) Specifying MySQL directory path during Windows installation.



3.3.3 Virtual Appliance (vApp)

The procedure is simple for vApp deployments. The underlying datastore helps in auto-expansion; you can always expand the current installation space from the underlying datastore.

To expand the /data space, you must first expand the hard disk space at the virtual machine's resource tab and then expand the actual space of the MySQL data partition from the vApp's maintenance console.

Note: The underlying datastore should have the extra space required for you to provision for the VM in question.

4 Sizing Guidelines

There is no one size that fits all in planning compute resources for Unified Manager. To accommodate numerous sizes of configurations and deployments, Unified Manager 7.2 has no hard limit on the space and memory reservations. This is particularly helpful for customers with smaller ONTAP footprints, or who have an instance hosted from a host with very little configuration.

Customers who have a relatively large footprint can start with the recommendations in Table 2.

Table 2) Resource requirements for Unified Manager.

Node Count	Memory (GB)	Disk Space (GB)	Backup Space (GB)
Up to 48	12	150	3 times /opt/netapp/data
>48	Depends on Scale Monitor recommendations	Depends on Scale Monitor recommendations	3 times /opt/netapp/data

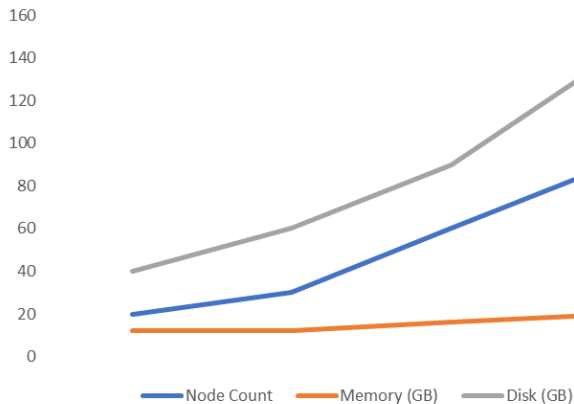
For example, if the MySQL directory (/opt/netapp/backup) space is set to 150GB, the backup space should be set to 450GB (3 times the MySQL data space).

Notes:

- If you want to schedule backup, plan your backup destination to have 3 times the primary data (/opt/netapp/data) consumed space.
- The space requirement for backup is different from the MYSQL data space (/opt/netapp/data). You can provision another network path, either NAS or SAN.

As your ONTAP system footprint expands, Unified Manager requires additional resources (disk, memory, and so on) to monitor and manage additional storage objects, as shown in Figure 4.

Figure 4) Unified Manager resource consumption.



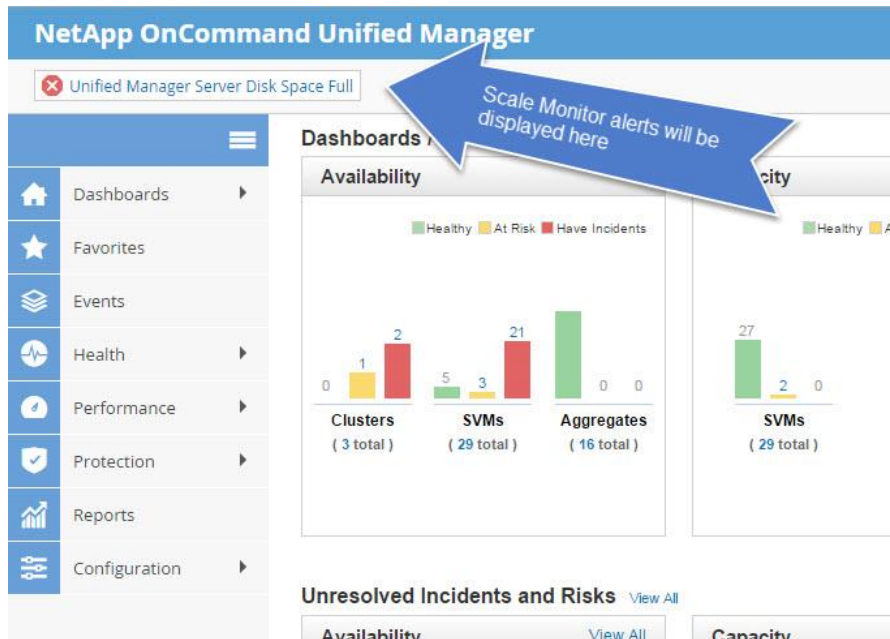
Note: The graph shows example data, not to scale.

Additional resources requirement is addressed with Scale Monitor alerts, as described below.

4.1 Scale Monitor

Unified Manager 7.2 introduced a Scale Monitor feature that tracks disk and memory usage and advises in scenarios where increasing these system resources enables scaling your Unified Manager instance. Scale Monitor offers predefined alerts for monitoring disk and memory, which aids in vertical scaling. The alerts are displayed separately in the top left corner of the screen. Warning events also display a possible remediation step.

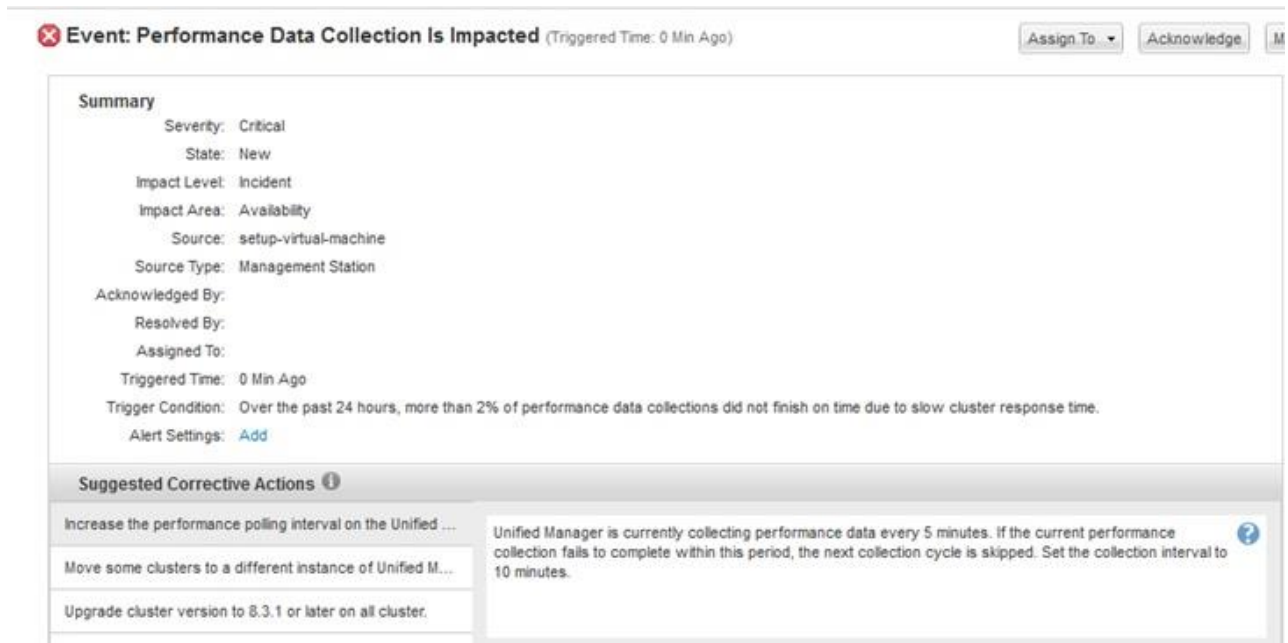
Figure 5) Scale Monitor alerts.



The following categories of alerts notify you about issues with Unified Manager scaling:

- Disk space nearly full (/opt/netapp/data > 90%)
- Disk space full (/opt/netapp/data > 95%)
- Performance analysis impacted
- Performance collection impacted

Figure 6) Memory utilization alert example.



5 Unified Manager Backup

NetApp Unified Manager 7.2 collects and maintains performance, capacity, and health data in a single unified MySQL database. When a backup is triggered, a temporary dump of the MySQL database is created in the backup directory, requiring additional temporary space for every iteration of backup. For every incremental backup, the backup file is appended with the new delta. Therefore, NetApp recommends configuring the backup space to be 3 times the size of the MySQL database.

This configuration comes with some additional cost to maintain the temporary space inside the /opt/netapp/data space. You should plan to have the backup directory mounted from low-cost storage and from an independent network location, for two reasons:

- Having your backups in a different location helps in recovering your database when the primary location (/opt/netapp/data) is unavailable.
- The space requirement for backups is 3 times the size of the MySQL database. Therefore, it is best to store backup data in cheaper storage

5.1 Defining a Custom Backup Path

To store your backup data in a different location, define the network path in the backup settings as shown in Figure 7.

Figure 7) Define the backup path for RHEL hosts.

The screenshot shows a dialog box titled "Database Backup Settings" with a question mark icon. The "Path:" field is highlighted with a red border and contains the text "/data/ocum-backup/". Below it, the "Retention Count:" field contains the number "10" and has a tooltip that says "Enter 0 for unlimited backups". The "Schedule Frequency:" section has an "Enable" checkbox which is unchecked, and two radio buttons: "Daily" (which is selected) and "Weekly". At the bottom right of the dialog are "Save and Close" and "Cancel" buttons.

Note: The path shown in Figure 7 is different for vApp and Windows environments.

5.2 Prerequisites for Selecting a Different Backup Space in RHEL and Windows

For the custom backup location to work, it is necessary to reassign ownership of a new backup path to User:jboss and Group:jboss.

For example, in a Red Hat installed base, the custom backup directory should have the use: group permission as jboss:jboss.

Note: For vApp instances, the backup recommendations are different, as described in Section 5.3.

5.3 vApp Backup

For Unified Manager instances deployed on vApp, you cannot move data out of the vApp instance. Therefore, NetApp recommends taking backups only by VMware consistent snapshots.

5.3.1 vApp Backup Procedure

For Unified Manager vApp deployments, NetApp recommends the following backup procedure:

1. Create a VMware consistent snapshot.

Note: You cannot move data out of vApp instance. Taking VMware consistent backup snapshots is the best way to maintain backups for longer retention periods.

2. Take a backup of the VMware snapshot with your vendor-specific backup solution, for longer retention.

6 Deployment Guidelines

Enterprises usually deploy multiple management servers to manage and monitor their data centers. With Unified Manager 7.2, you need only one system to manage, monitor, and alert on the health and performance metrics of your NetApp systems. NetApp recommends having a single instance manage individual data centers. Although it's always beneficial to manage smaller data centers with a single Unified Manager, you need a dedicated management network between sites to monitor NetApp systems with a single Unified Manager instance. This approach requires meticulous planning with your network experts.

7 References

For specific implementation steps, consult the following videos, guides, and technical reports.

7.1 Unified Manager Videos

- Unified Manager 7.2 overview video: <https://www.youtube.com/watch?v=i5u9z1-saqQ&t=2s>
- Unified Manager video: <https://www.youtube.com/watch?v=i5u9z1-saqQ&list=PLdXI3bZJEw7mp3jFSg0IJgo3oeDQRY-GI>

7.2 Technical Reports and Documentation

- Migrating Performance Data from Unified Manager 7.1 to Unified Manager 7.2: <http://www.netapp.com/us/media/tr-4589.pdf>
- OnCommand Unified Manager Reporting for NetApp ONTAP: <http://www.netapp.com/us/media/tr-4565.pdf>
- OnCommand Unified Manager 7.2 documentation: <https://mysupport.netapp.com/info/web/ECMLP2688087.html>

Version History

Version	Date	Author	Description
1.0	17 th Aug 2017	Dhiman Chakraborty	Added best practices for Installation guidelines, sizing, backup, and deployment scenarios for OnCommand Unified Manager 7.2.

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