



Introduction to Active IQ Unified Manager

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Introduction to Active IQ Unified Manager

Active IQ Unified Manager (formerly OnCommand Unified Manager) enables you to monitor and manage the health and performance of your ONTAP storage systems from a single interface.

Unified Manager provides the following features:

- Discovery, monitoring, and notifications for systems that are installed with ONTAP software.
- Dashboard to show capacity, security, and performance health of the environment.
- Enhanced alerts, events, and threshold infrastructure.
- Displays detailed graphs that plot workload activity over time; including IOPS (operations), MBps (throughput), latency (response time), utilization, performance capacity, and cache ratio.
- Identifies workloads that are overusing cluster components and the workloads whose performance is impacted by the increased activity.
- Provides suggested corrective actions that can be performed to address certain incidents and events, and a “Fix It” button for some events so you can resolve the issue immediately.
- Integrates with OnCommand Workflow Automation to execute automated protection workflows.
- Ability to create new workloads, such as a LUN or file share, directly from Unified Manager and assign a Performance Service Level to define the performance and storage objectives for the users accessing the application using that workload.

Introduction to Active IQ Unified Manager health monitoring

Active IQ Unified Manager (formerly OnCommand Unified Manager) helps you to monitor a large number of systems running ONTAP software through a centralized user interface. The Unified Manager server infrastructure delivers scalability, supportability, and enhanced monitoring and notification capabilities.

The key capabilities of Unified Manager include monitoring, alerting, managing availability and capacity of clusters, managing protection capabilities, and bundling of diagnostic data and sending it to technical support.

You can use Unified Manager to monitor your clusters. When issues occur in the cluster, Unified Manager notifies you about the details of such issues through events. Some events also provide you with a remedial action that you can take to rectify the issues. You can configure alerts for events so that when issues occur, you are notified through email, and SNMP traps.

You can use Unified Manager to manage storage objects in your environment by associating them with annotations. You can create custom annotations and dynamically associate clusters, storage virtual machines (SVMs), and volumes with the annotations through rules.

You can also plan the storage requirements of your cluster objects using the information provided in the capacity and health charts, for the respective cluster object.

Unified Manager health monitoring features

Unified Manager is built on a server infrastructure that delivers scalability, supportability,

and enhanced monitoring and notification capabilities. Unified Manager supports monitoring of systems running ONTAP software.

Unified Manager includes the following features:

- Discovery, monitoring, and notifications for systems that are installed with ONTAP software:
 - Physical objects: nodes, disks, disk shelves, SFO pairs, ports, and Flash Cache
 - Logical objects: clusters, storage virtual machines (SVMs), aggregates, volumes, LUNs, namespaces, qtrees, LIFs, Snapshot copies, junction paths, NFS shares, SMB shares, user and group quotas, QoS policy groups, and initiator groups
 - Protocols: CIFS, NFS, FC, iSCSI, NVMe, and FCoE
 - Storage efficiency: SSD aggregates, Flash Pool aggregates, FabricPool aggregates, deduplication, and compression
 - Protection: SnapMirror relationships (synchronous and asynchronous) and SnapVault relationships
- Viewing the cluster discovery and monitoring status
- MetroCluster configuration: viewing and monitoring the configuration, MetroCluster switches and bridges, issues, and connectivity status of the cluster components
- Enhanced alerts, events, and threshold infrastructure
- LDAP, LDAPS, SAML authentication, and local user support
- RBAC (for a predefined set of roles)
- AutoSupport and support bundle
- Enhanced dashboard to show capacity, availability, protection, and performance health of the environment
- Volume move interoperability, volume move history, and junction path change history
- Scope of Impact area that graphically displays the resources that are impacted for events such as Some Failed Disks, MetroCluster Aggregate Mirroring Degraded, and MetroCluster Spare Disks Left Behind events
- Possible Effect area that displays the effect of the MetroCluster events
- Suggested Corrective Actions area that displays the actions that can be performed to address events such as Some Failed Disks, MetroCluster Aggregate Mirroring Degraded, and MetroCluster Spare Disks Left Behind events
- Resources that Might be Impacted area that displays the resources that might be impacted for events such as for the Volume Offline event, the Volume Restricted event, and the Thin-Provisioned Volume Space At Risk event
- Support for SVMs with FlexVol or FlexGroup volumes
- Support for monitoring node root volumes
- Enhanced Snapshot copy monitoring, including computing reclaimable space and deleting Snapshot copies
- Annotations for storage objects
- Report creation and management of storage object information such as physical and logical capacity, utilization, space savings, performance, and related events
- Integration with OnCommand Workflow Automation to execute workflows

The Storage Automation Store contains NetApp-certified automated storage workflow packs developed for use with OnCommand Workflow Automation (WFA). You can download the packs, and then import them to

WFA to execute them. The automated workflows are available at the following [Storage Automation Store](#)

Introduction to Active IQ Unified Manager performance monitoring

Active IQ Unified Manager (formerly OnCommand Unified Manager) provides performance monitoring capabilities and event root-cause analysis for systems that are running NetApp ONTAP software.

Unified Manager helps you to identify workloads that are overusing cluster components and decreasing the performance of other workloads on the cluster. By defining performance threshold policies you can also specify maximum values for certain performance counters so that events are generated when the threshold is breached. Unified Manager alerts you about these performance events so that you can take corrective action, and bring performance back to normal levels of operation. You can view and analyze events in the Unified Manager UI.

Unified Manager monitors the performance of two types of workloads:

- User-defined workloads

These workloads consist of FlexVol volumes and FlexGroup volumes that you have created in your cluster.

- System-defined workloads

These workloads consist of internal system activity.

Unified Manager performance monitoring features

Unified Manager collects and analyzes performance statistics from systems running ONTAP software. It uses dynamic performance thresholds and user-defined performance thresholds to monitor a variety of performance counters over many cluster components.

A high response time (latency) indicates that the storage object, for example, a volume, is performing slower than normal. This issue also indicates that the performance has decreased for client applications that are using the volume. Unified Manager identifies the storage component where the performance issue lies and provides a list of suggested actions you can take to address the performance issue.

Unified Manager includes the following features:

- Monitors and analyzes workload performance statistics from a system running ONTAP software.
- Tracks performance counters for clusters, nodes, aggregates, ports, SVMs, volumes, LUNs, NVMe namespaces, and network interfaces (LIFs).
- Displays detailed graphs that plot workload activity over time; including IOPS (operations), MB/s (throughput), latency (response time), utilization, performance capacity, and cache ratio.
- Enables you to create user-defined performance threshold policies that trigger events and send email alerts when the thresholds are breached.
- Uses system-defined thresholds and dynamic performance thresholds that learn about your workload activity to identify and alert you to performance issues.

- Identifies the quality of service (QoS) policies and Performance Service Level policies (PSLs) that are applied to your volumes and LUNs.
- Clearly identifies the cluster component that is in contention.
- Identifies workloads that are overusing cluster components and the workloads whose performance is impacted by the increased activity.

Using Unified Manager REST APIs

Active IQ Unified Manager provides you with REST APIs to view the information about monitoring and managing your storage environment. APIs also allow provisioning and managing storage objects based on policies.

You can also execute ONTAP APIs on all ONTAP-managed clusters by using the API gateway supported by Unified Manager.

For information about Unified Manager REST APIs, see [Getting started with Active IQ Unified Manager](#).

What the Unified Manager server does

The Unified Manager server infrastructure consists of a data collection unit, a database, and an application server. It provides infrastructure services such as discovery, monitoring, role-based access control (RBAC), auditing, and logging.

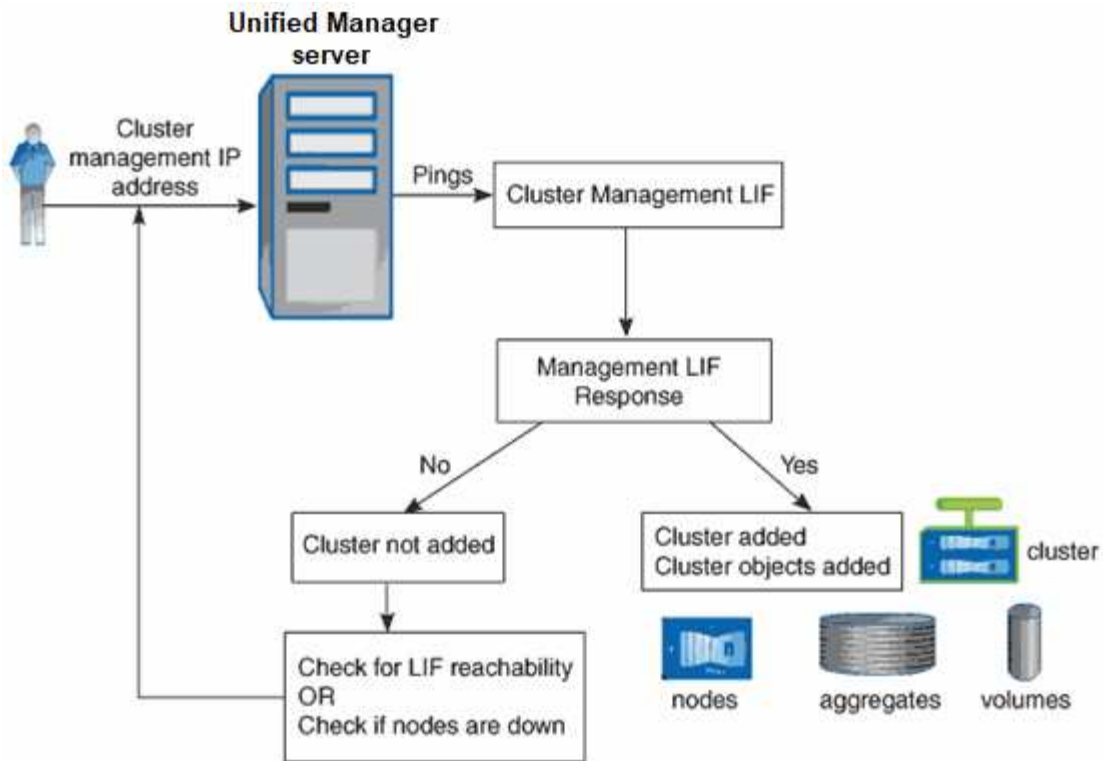
Unified Manager collects cluster information, stores the data in the database, and analyzes the data to see if there are any cluster issues.

How the discovery process works

After you have added the cluster to Unified Manager, the server discovers the cluster objects and adds them to its database. Understanding how the discovery process works helps you to manage your organization's clusters and their objects.

The default monitoring interval is 15 minutes: if you have added a cluster to Unified Manager server, it takes 15 minutes to display the cluster details in the Unified Manager UI.

The following image illustrates the discovery process in Active IQ Unified Manager:



Cluster configuration and performance data collection activity

The collection interval for *cluster configuration data* is 15 minutes. For example, after you have added a cluster, it takes 15 minutes to display the cluster details in the Unified Manager UI. This interval applies when making changes to a cluster too.

For example, if you add two new volumes to an SVM in a cluster, you see those new objects in the UI after the next polling interval, which could be up to 15 minutes.

Unified Manager collects current *performance statistics* from all monitored clusters every five minutes. It analyzes this data to identify performance events and potential issues. It retains 30 days of five-minute historical performance data and 180 days of one-hour historical performance data. This enables you to view very granular performance details for the current month, and general performance trends for up to a year.

The collection polls are offset by a few minutes so that data from every cluster is not sent at the same time, which could affect performance.

The following table describes the collection activities that Unified Manager performs:

Activity	Time interval	Description
Performance statistics poll	Every 5 minutes	Collects real-time performance data from each cluster.

Activity	Time interval	Description
Statistical analysis	Every 5 minutes	<p>After every statistics poll, Unified Manager compares the collected data against user-defined, system-defined, and dynamic thresholds.</p> <p>If any performance thresholds have been breached, Unified Manager generates events and sends email to specified users, if configured to do so.</p>
Configuration poll	Every 15 minutes	Collects detailed inventory information from each cluster to identify all the storage objects (nodes, SVMs, volumes, and so on).
Summarization	Every hour	<p>Summarizes the latest 12 five-minute performance data collections into hourly averages.</p> <p>The hourly average values are used in some of the UI pages, and they are retained for 180 days.</p>
Forecast analysis and data pruning	Every day after midnight	<p>Analyzes cluster data to establish dynamic thresholds for volume latency and IOPS for the next 24 hours.</p> <p>Deletes from the database any five-minute performance data older than 30 days.</p>
Data pruning	Every day after 2 a.m.	Deletes from the database any events older than 180 days and dynamic thresholds older than 180 days.
Data pruning	Every day after 3:30 a.m.	Deletes from the database any one-hour performance data older than 180 days.

What a data continuity collection cycle is

A data continuity collection cycle retrieves performance data outside of the real-time cluster performance collection cycle that runs, by default, every five minutes. Data continuity collections enable Unified Manager to fill in gaps of statistical data that occur

when it was unable to collect real-time data.

Unified Manager performs data continuity collection polls of historical performance data when the following events occur:

- A cluster is initially added to Unified Manager.

Unified Manager gathers historical performance data for the previous 15 days. This enables you to view two weeks of historical performance information for a cluster a few hours after it is added.

Additionally, system-defined threshold events are reported for the previous period, if any exist.

- The current performance data collection cycle does not finish on time.

If the real-time performance poll goes beyond the five-minute collection period, a data continuity collection cycle is initiated to gather that missing information. Without the data continuity collection, the next collection period is skipped.

- Unified Manager has been inaccessible for a period of time and then it comes back online, as in the following situations:
 - It was restarted.
 - It was shut down during a software upgrade or when creating a backup file.
 - A network outage is repaired.
- A cluster has been inaccessible for a period of time and then it comes back online, as in the following situations:
 - A network outage is repaired.
 - A slow wide area network connection delayed the normal collection of performance data.

A data continuity collection cycle can collect a maximum of 24 hours of historical data. If Unified Manager is down for longer than 24 hours, a gap in performance data appears in the UI pages.

A data continuity collection cycle and a real-time data collection cycle cannot run at the same time. The data continuity collection cycle must finish before the real-time performance data collection is initiated. When the data continuity collection is required to collect more than one hour of historical data, then you see a banner message for that cluster at the top of the Notifications pane.

What the timestamp means in collected data and events

The timestamp that appears in collected health and performance data, or that appears as the detection time for an event, is based on the ONTAP cluster time, adjusted to the time zone set on the web browser.

It is highly recommended that you use a Network Time Protocol (NTP) server to synchronize the time on your Unified Manager servers, ONTAP clusters, and web browsers.



If you see timestamps that look incorrect for a particular cluster, you might want to check that the cluster time has been set correctly.

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