



Kubernetes Explorer

Cloud Insights

NetApp

October 25, 2022

This PDF was generated from https://docs.netapp.com/us-en/cloudinsights/kubernetes_landing_page.html on October 25, 2022. Always check docs.netapp.com for the latest.

Table of Contents

- Kubernetes Explorer..... 1
 - Kubernetes Cluster Overview 1
 - Kubernetes Cluster Detail Page..... 2
 - ONTAP Essentials 6

Kubernetes Explorer

Kubernetes Cluster Overview

The Cloud Insights Kubernetes Explorer is a powerful tool for displaying the overall health and usage of your Kubernetes clusters and allows you to easily drill down into areas of investigation.

Clicking on **Dashboards > Kubernetes Explorer** opens the Kubernetes Cluster list page. This overview page contains table of the Kubernetes clusters in your environment.



The screenshot shows the top of the Kubernetes Explorer interface. At the top left is a 'Filter By' button with a plus icon and a help icon. Below it, the text 'Clusters (2)' is displayed. A table follows with columns for Name, Overall Saturation (%), CPU Saturation (%), Memory Saturation (%), Storage Saturation (%), Nodes, Pods, Namespaces, and Workloads. Two clusters are listed: 'self' and 'setoK3s'.

Name ↑	Overall Saturation (%)	CPU Saturation (%)	Memory Saturation (%)	Storage Saturation (%)	Nodes	Pods	Namespaces	Workloads
self	56	25	56	31	2	63	18	68
setoK3s	4	2	3	4	2	9	5	7

Cluster list

The cluster list displays the following information for each cluster in your environment:

- Cluster **Name**. Clicking on a cluster name will open the [detail page](#) for that cluster.
- **Saturation** percentages. Overall Saturation is the highest of CPU, Memory, or Storage Saturation.
- Number of **Nodes** in the cluster. Clicking this number will open the Node list page.
- Number of **Pods** in the cluster. Clicking this number will open the Pod list page.
- Number of **Namespaces** in the cluster. Clicking this number will open the Namespace list page.
- Number of **Workloads** in the cluster. Clicking this number will open the Workload list page.

Refining the Filter

When you are filtering, as you begin typing you are presented with the option to create a **wildcard filter** based on the current text. Selecting this option will return all results that match the wildcard expression. You can also create **expressions** using NOT or AND, or you can select the "None" option to filter for null values in the field.



Filters based on wildcards or expressions (e.g. NOT, AND, "None", etc.) display in dark blue in the filter field. Items that you select directly from the list are displayed in light blue.



Kubernetes filters are contextual, meaning for example that if you are on a specific node page, the pod_name filter only lists pods related to that node. Moreover, if you apply a filter for a specific namespace, then the pod_name filter will list only pods on that node *and* in that namespace.

Note that Wildcard and Expression filtering works with text or lists but not with numerics, dates or booleans.

Kubernetes Cluster Detail Page

The Kubernetes cluster detail page displays a detailed overview of your Kubernetes cluster.



Namespace, Node, and Pod Counts

The counts at the top of the page show you the total number of namespaces, nodes, and pods in the cluster, as well as the number of popds that are currently alerting and pending.

Shared Resources and Saturation

On the top right of the detail page is your cluster saturation as a current percentage as well as a graph showing the recent trend over time. Cluster saturation is the highest of CPU, memory, or storage saturation at each point in time.

Below that, the page shows by default **Shared Resources** usage, with tabs for CPU, Memory, and Storage. Each tab shows the saturation percentage and trend over time, with additional usage details. For storage, the value shown is the greater of backend and filesystem saturation, which are calculated independently.

The devices with the highest usage are shown in a table at the bottom. Click any link to explore these devices.

Namespaces

The Namespaces tab displays a list of all the namespaces in your Kubernetes environment, showing CPU and Memory usage as well as a count of workloads in each namespace. Click the Name links to explore each namespace.

Shared Resources	Namespaces	Workloads	
Namespaces (5)			
Name ↓	CPU Usage (cores)	Memory Usage (GiB)	Workload Count
netapp-monitoring	0.25	0.38	4
kube-system	0.01	0.03	3
kube-public	0.00	0.00	0
kube-node-lease	0.00	0.00	0
default	0.00	<0.01	1

Workloads

Similarly, the Workloads tab displays a list of the workloads in each namespace, again showing CPU and Memory usage. Clicking the Namespace links drills into each.

Shared Resources	Namespaces	Workloads	
Workloads (8)			
Name ↓	CPU Usage (cores)	Memory Usage (GiB)	Namespace
telegraf-rs-lf9gg	0.24	0.24	netapp-monitoring
telegraf-ds-k957c	0.01	0.10	netapp-monitoring
nginx	0.00	<0.01	default
monitoring-operator-6fcf4755ff-p2cs6	<0.01	0.02	netapp-monitoring
metrics-server-7b4f8b595-f7j9f	<0.01	0.01	kube-system
local-path-provisioner-64d457c485-289gx	<0.01	0.01	kube-system
kube-state-metrics-7995866f8c-t8c49	<0.01	0.01	netapp-monitoring
coredns-5d69dc75db-nkw5p	<0.01	0.01	kube-system

The Cluster "Wheel"



The Cluster "Wheel" section provides node and pod health at a glance, which you can drill into for more information. If your cluster contains more nodes than can be displayed in this area of the page, you will be able to turn the wheel using the buttons available.

Alerting pods or nodes are displayed in red. "Warning" areas are displayed in orange. Pods that are unscheduled (that is, unattached) will display in the lower corner of the Cluster "Wheel".

Hovering over a pod (circle) or Node (bar) will extend the view of the node.



Clicking on the pod or node in that view will zoom in to the expanded Node view.



From here, you can hover over an element to display details about that element. For example, hovering over the critical pod in this example displays details about that pod.



You can view Filesystem, Memory, and CPU information by hovering over the Node elements.



A note about the gauges

The Memory and CPU gauges show three colors, since they show *used* in relation to both *allocatable capacity* and *total capacity*.

ONTAP Essentials

ONTAP Essentials is a set of dashboards and workflows that provide detailed overviews of your ONTAP inventories and workloads. You may see the following terms used when working in ONTAP Essentials:

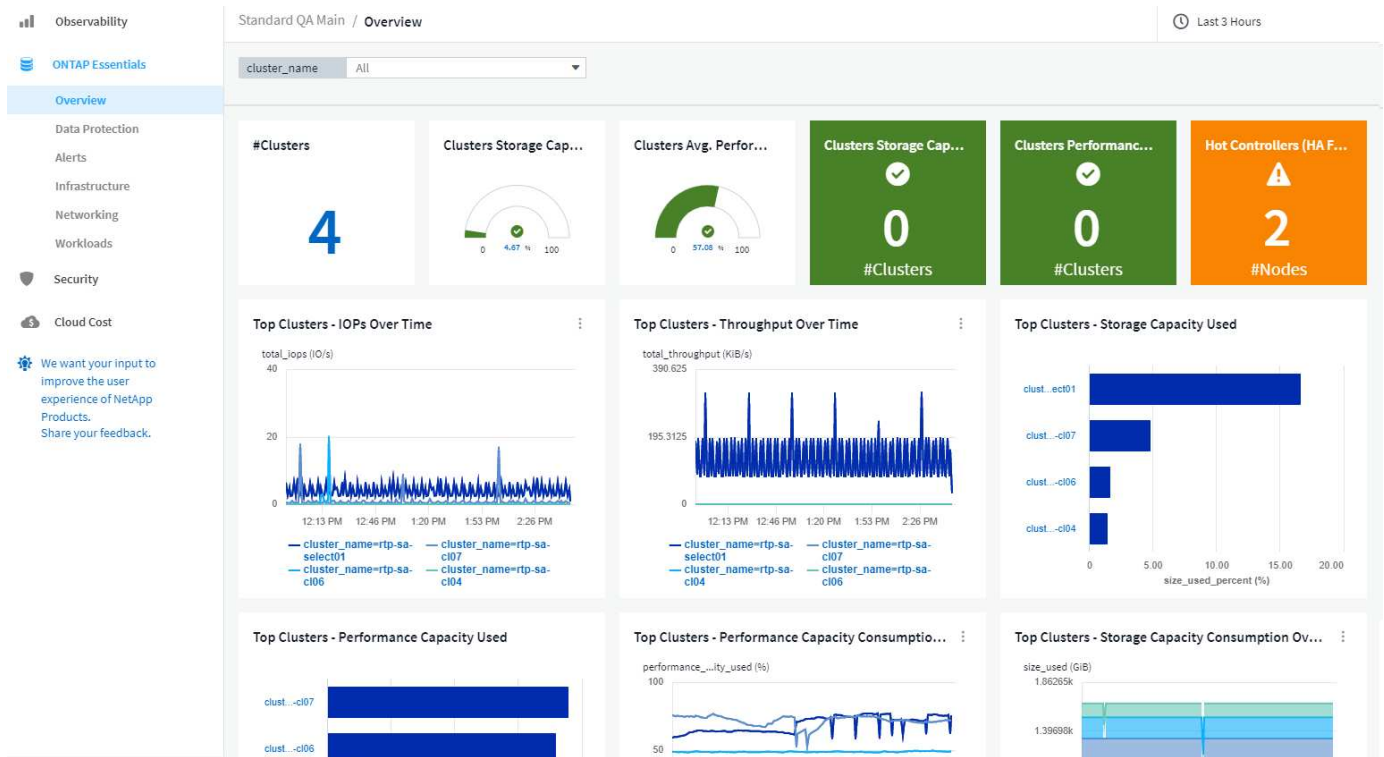
- Infrastructure/Inventory: Objects that provide storage/networking services to user data
- Workloads: Objects that provide interface to users to read/write data.
- Data Protection: Objects that can be protected using NetApp data protection technologies

You can find more definitions on the [ONTAP Data Collector](#) page.

ONTAP Essentials requires at least one working ONTAP data collector with data collected within the last seven days.

Overview

To begin exploring, select **ONTAP Essentials** from the main Cloud Insights menu.



The **Overview** dashboard displays useful information like the number of clusters in your environment with their overall capacity and performance percentages. You will also see predictive data regarding the number of expected days until storage capacity or performance capacity runs out of space. And if any controllers in your infrastructure are running at high temperatures, ONTAP Essentials will show you those.

Informative graphs give you a look into performance over time as well as breakdowns of capacity usage.

Each of these graphs or data points can be used as a starting point for exploration or investigation.

Note: A "days to full" number of "0" (zero) indicates that days to full is estimated at greater than 90 days. In other words, your systems aren't in danger of running out of space any time soon.

Data Protection

Select the **Data Protection** page to view SnapMirror relationships. Click through to source or destination volume information, or click the gear icon to add columns for the data you wish to view.

netapp_ontap.snapmirror

All Relationships

Filter By

cluster_vendor

NetApp

Group


netapp_ontap.snapmirror

28 items found

Table Row Grouping	Metrics & Attributes						
netapp_ontap.snapmirror	relationship...	is_healthy	lag_time (sec)	last_successful_u...	policy_name	source.volume_n...	destination.volu...
dpsvm01:leafy_SL_unified_dest_01	idle	✓		N/A	MirrorAndVault	leafy_SL_unified_...	leafy_SL_unified_...
dpsvm01:dpsvm01_vol_NSLM_VOL_LUN_1592	idle	✓	1,842.00	2022-07-27 13:35:0...	XDPDefault	vol_NSLM_VOL_L...	dpsvm01_vol_NSL...
dpsvm01:a_demo_volume_dest01	idle	✓	142.00	2022-07-27 13:35:0...	LEAFTYSLVAULT		a_demo_volume_...
mattsvm07:mattsvm07_volume3	idle	✓		2022-07-13 20:08:1...	SVM-DR-identity-p...		mattsvm07_volum...
dpsvm01:rtp_demo_01_leafydemo01_Asynch	idle	✓	11,107,543.00	2022-07-27 13:10:0...	XDPDefault		rtp_demo_01_lea...
rtp-sa-cl07-svm-01:test_Phil_mirror_create_tes	idle	✓	135,033,424.00	N/A	MirrorAllSnapshots		test_Phil_mirror_c...
mattsvm07:mattsvm07_volume4	idle	✓		2022-07-13 20:08:1...	SVM-DR-identity-p...		mattsvm07_volum...
dpsvm01:vol_LEAFTYDEMOLUN01_dest	idle	✓	1,843.00	2022-07-27 13:05:0...	Asynchronous		vol_LEAFTYDEMOL...
rtp-sa-cl07-svm-01:mirror_samplesource1_desi	idle	✓	1,843.00	2022-07-27 13:05:0...	Asynchronous		mirror_samplesou...
astra_301:vol1_dp	idle	✓	8,299,460.00	N/A	XDPDefault	vol1	vol1_dp
rtp-sa-cl07-svm-01:vol_pgb_sm_fanout_srcsv_	idle	✓	48,343.00	2022-07-27 00:10:0...	pgb_mirror_vault		vol_pgb_sm_fano...

Alerts

Here you can view the Active alerts in your environment and quickly drill down into potential problems. Select the *Resolved* tab to view alerts that have been resolved.

 **ONTAP Essentials**

Overview

Data Protection

Alerts

Infrastructure

Networking

Workloads

Active (86) Resolved (0)

Filter By

triggeredOn

cluster_vendor: NetApp

status

New

In process

currentSeverity

Warning

Critical

Change All Alerts Status

alertId	triggeredTime ↓	currentSeverity	monitor	triggeredOn	status	hasCorrective Actions
AL-356704	12 hours ago Sep 9, 2022 2:16 AM	Critical	Snapshot Reserve Space ...	cluster_name: rtp-sa-cl04 vserver_name: test_ran volume_name: thick_vol_2 cluster_uuid: f34cd2c8-f1b3-11e9-b97f-00a0985f6587 cluster_vendor: NetApp cluster_model: AFF8040	New	✓
AL-355988	a day ago Sep 8, 2022 11:00 AM	Warning	User Quota Capacity Soft ...	cluster_name: rtp-sa-cl06 volume: qtreesvol1 quota_type: user user_or_group: 16716 cluster_uuid: da294f0d-ad92-11e6-9969-00a0987b8fe8 cluster_vendor: NetApp cluster_model: FAS2552	New	✓

Infrastructure

The ONTAP Essentials **Infrastructure** page gives you a view of cluster health and performance, using pre-built (yet further customizable) queries on all the basic ONTAP objects. Select the object type you wish to explore (cluster, storage pool, etc.) and choose whether to view health or performance information. Set filters to dive deeper into individual systems.

The screenshot shows the 'netapp_ontap.aggregate' dropdown menu open, displaying a list of storage pools. The 'All Storage Pools' option is highlighted in blue. The menu also includes options for 'Health', 'Performance', and 'Capacity'. The background shows a table with columns for 'Table Row Grouping' and 'Items found'.

Infrastructure page showing cluster health:

Observability

ONTAP Essentials

Overview

Data Protection

Infrastructure

Workloads

Security

We want your input to improve the user experience of NetApp Products. Share your feedback.

hhdks4 / Infrastructure / All Clusters - Health

Last 3 Hours

netapp_ontap.cluster

All Clusters

Filter By

cluster_vendor

NetApp

+

?

Group

netapp_ontap.cluster

3 items found

Table Row Grouping

Metric & Attributes

netapp_ontap.cluster	cluster_version	node_count	cluster_location
rtp-sa-cl07	NetApp Release 9.8P13: Fri Jul 15 22:...	2	SA East Lab, RTP 1.3, Jxx
umeng-aff300-05-06	NetApp Release 9.9.1P9X3: Tue Apr 1...	2	GDL QQ 22
umeng-aff300-01-02	NetApp Release Metropolitan_9.11...	2	GDL

Networking

ONTAP Essentials Networking gives you views into your FC, NVME FC, Ethernet, and iSCSI infrastructure. On these pages you can explore things like ports in your clusters and their nodes.

ONTAP Essentials

Overview

Data Protection

Alerts

Infrastructure

Networking

Workloads

Active (86)Resolved (0)

Filter By

triggeredOn

cluster_vendor: NetApp

status

New

In process

currentSeverity

Warning

Critical

+?

Alerts (86)

Change All Alerts Status

alertid	triggeredTime	currentSeverity	monitor	triggeredOn	status	hasCorrective Actions
AL-356704	12 hours ago Sep 9, 2022 2:16 AM	Critical	Snapshot Reserve Space ...	cluster_name: rtp-sa-cl04 vserver_name: test_ran volume_name: thick_vol_2 cluster_uuid: f34cd2c8-f1b3-11e9-b97f-00a0985f6587 cluster_vendor: NetApp cluster_model: AFF8040	New	✓
AL-355988	a day ago Sep 8, 2022 11:00 AM	Warning	User Quota Capacity Soft ...	cluster_name: rtp-sa-cl06 volume: qtreesvol1 quota_type: user user_or_group: 16716 cluster_uuid: da294f0d-ad92-11e6-9969-00a0987b8fe8 cluster_vendor: NetApp cluster_model: FAS2552	New	✓

Workloads

View and explore workloads on LUNs/Volumes, NFS or SMB Shares, or Qtrees in your environment.

ONTAP Essentials

Overview

Data Protection

Infrastructure

Workloads

Security

LUNs / Volumes

Qtrees

netapp_ontap.lun

All LUNs

Filter By

cluster_vendor

NetApp

X

X

+

?

Group

netapp_ontap.lun

X

13 items found

Table Row Grouping	Metrics & Attributes								
netapp_ontap.lun	total_lat...	total_iops (IO/s)	total_through...	size (B)	size_used (B)	volume	vserver_name	aggregate_name	node
/vol/ste/ste	0.00	0.00	0.00	53,694,627,840...	0.00	ste	vs_test	umeng_aff300...	ui
/vol/kubebug/kubebuglun1	0.00	0.00	0.00	85,905,637,376...	1,489,985,536.00	kubebug	vs_test	umeng_aff300...	ui
/vol/trident_pvc_3ef5a87c_4149_44e8_8113...	0.00	0.00	0.00	1,073,741,824.00	0.00	trident_pvc_3e...	vs_test	umeng_aff300...	ui
/vol/trident_pvc_0b4ffd4_3f11_4d63_aa01_...	0.00	0.00	0.00	1,073,741,824.00	0.00	trident_pvc_0b...	vs_test	umeng_aff300...	ui
/vol/NSLM_VOL_LUN_1597772263794/matts...	0.00	0.00	0.00	1,073,741,824.00	0.00	NSLM_VOL_LU...	VMware_test	aggr_data_01_...	rt
/vol/mattlun12345/mattlun12345	0.00	0.00	0.00	1,073,741,824.00	0.00	mattlun12345	VMware_test	aggr_data_01_...	rt
/vol/kubebug1/kubebuglun2	0.00	0.00	0.00	85,904,826,368...	0.00	kubebug1	vs_test	umeng_aff300...	ui
/vol/trident_pvc_d66d7f51_a623_4fc3_8cda...	0.00	0.00	0.00	1,073,741,824.00	0.00	trident_pvc_d6...	vs_test	umeng_aff300...	ui
/vol/Rah/Rah	0.00	0.00	0.00	57,576,960.00	0.00	Rah	vs_test	umeng_aff300...	ui
/vol/chap_test_lun_vol/chap_test_lun	0.00	0.00	0.00	107,374,182,40...	0.00	chap_test_lun_...	VMware_test	aggr_data_01_...	rt
/vol/windows_iscsi_example/windows_iscsi...	0.00	0.00	1.04	1,073,741,824.00	10,911,744.00	windows_iscsi...	VMware_test	aggr_data_01_...	rt
/vol/vol_test/lun1	0.04	0.10	0.00	1,073,741,824.00	0.00	vol_test	vs_test	umeng_aff300...	ui
/vol/osc_iscsi_vol01/osc_iscsi_vol01	2.11	116.83	2,737,374.33	4,398,046,511,1...	2,535,381,008,3...	osc_iscsi_vol01	osc	umeng_aff300...	ui

Copyright Information

Copyright © 2022 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 <http://www.netapp.com/TM> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.