

Monitoring

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Table of Contents

Monitoring	. 1
Monitoring using Cloud Insights for VMs in Red Hat OpenShift Virtualization	. 1
Integration with Cloud Insights for VMs in Red Hat OpenShift Virtualization	. 2
Sample Monitoring capabilities for VMs in Red Hat OpenShift Virtualization	. 2

Monitoring

Monitoring using Cloud Insights for VMs in Red Hat OpenShift Virtualization

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This section of the reference document provides details for integrating NetApp Cloud Insights with a Red Hat OpenShift Cluster to monitor OpenShift Virtualization VMs.

NetApp Cloud Insights is a cloud infrastructure monitoring tool that gives you visibility into your complete infrastructure. With Cloud Insights, you can monitor, troubleshoot, and optimize all your resources including your public clouds and your private data centers. For more information about NetApp Cloud Insights, refer to the Cloud Insights documentation.

To start using Cloud Insights, you must sign up on the NetApp BlueXP portal. For details, refer to the Cloud Insights Onboarding

Cloud Insights has several features that enable you to quickly and easily find data, troubleshoot issues, and provide insights into your environment. You can find data easily with powerful queries, you can visualize data in dashboards, and send email alerts for data thresholds you set. Refer to the video tutorials to help you understand these features.

For Cloud Insights to start collecting data you need the following

Data Collectors

There are 3 types of Data Collectors:

- * Infrastructure (storage devices, network switches, compute infrastructure)
- * Operating Systems (such as VMware or Windows)
- * Services (such as Kafka)

Data Collectors discover information from the data sources, such as ONTAP storage device (infrastructure data collector). The information gathered is used for analysis, validation, monitoring, and troubleshooting.

Acquisition Unit

If you are using an infrastructure Data Collector, you also need an Acquisition Unit to inject data into Cloud Insights. An Acquisition Unit is a computer dedicated to hosting data collectors, typically a Virtual Machine. This computer is typically located in the same data center/VPC as the monitored items.

Telegraf Agents

Cloud Insights also supports Telegraf as its agent for collection of integration data. Telegraf is a plugin-driven server agent that can be used to collect and report metrics, events, and logs.

Cloud Insights Architecture



Integration with Cloud Insights for VMs in Red Hat OpenShift Virtualization

To start collecting data for VMs in OpenShift Virtualization you will need to install:

- 1. A Kubernetes monitoring operator and data collector to collect Kubernetes data For complete instructions, refer to the documentation.
- 2. An acquisition unit to collect data from ONTAP storage that provides persistent storage for the VM disks For complete instructions, refer to the documentation.
- 3. A data collector for ONTAP For complete instructions, refer to the documentation

Additionally, if you are using StorageGrid for VM backups, you need a data collector for the StorageGRID as well.

Sample Monitoring capabilities for VMs in Red Hat OpenShift Virtualization

This section discusses monitoring using Cloud Insights for VMs in Red Hat OpenShift Virtualization.

Monitoring based on events and creating Alerts

Here is a sample where the namespace that contains a VM in OpenShift Virtualization is monitored based on

events. In this example, a monitor is created based on **logs.kubernetes**.event for the specified namespace in the cluster.

al	Observability	•	NetApp PCS Sandbox / Observability / Alerts / Manage Monitors / Monitor virtual-machines-demo-ns							
	Explore		Edit log monitor	Edit log monitor						
	Alerts		Filter/Advanced Query and Grou	p by in section 1 must not be	empty. If alert resolution is bas	sed on log entry, section 3 filter/advanced query also must not be empty.				
	Collectors		1 Select the log to monitor							
	Log Queries		Log Source logs.kubernetes.e	ocp-cluster4 X	× • × involvedobject.	namespace virtual-machines-demo X X Y + @ Advanced Query				
	Enrich		Group By - reason X	× •						
	Reporting	Ø	27 items found				Last			
			timestamp ↓	type	source	message				
0	Kubernetes	•	04/19/2024 10:31:18 AM	logs.kubernetes.event	kubernetes_cluster:ocp- cluster4;namespace:cloudi nsights- monitoring;pod_name:net app-cl-event-exporter- 7f7c8d84c4-sk7t9;	VirtualMachineInstance started. Ji				
۲	Workload Security	۲				et				
	ONTAP Essentials	•	04/19/2024 10:31:18 AM	logs.kubernetes.event	kubernetes_cluster:ocp-	VirtualMachineInstance defined.				
٩	Admin	•								
			~ * !* ~ !^ ~ * * ~ ~ * * * * * * * *			AL 1 1 1 1				
			2 Define alert behavior Create an alert at severity Warning ▼ when the conditions above occur 1 time							

This query provides all the events for the virtual machine in the namespace. (There is only one virtual machine in the namespace). An advanced query can also be constructed to filter based on the event where the reason is "failed" or "FailedMount" These events are typically created when there is an issue in creating a PV or mounting the PV to a pod indicating issues in the dynamic provisioner for creating persistent volumes for the VM.

While creating the Alert Monitor as shown above, you can also configure notification to recipients. You can also provide corrective actions or additional information that can be useful to resolve the error. In the above example, additional information could be to look into the Trident backend configuration and storage class definitions for resolving the issue.

Change Analytics

With Change Analytics, you can get a view of what changed in the state of your cluster including who made that change which can help in troubleshooting issues.

	letApp Cloud Insi	ghts	Tutorial 0% Complete Getting St	tarted 🔻				م	🌣 ? 😫 Sundhar Banu 🔻
al	Observability	•	NetApp PCS Sandbox / Kubernetes / Ch	ange Analysis				() Last	3 Hours 👻
0	Kubernetes	•	Filter By Kubernetes Cluster ocp-cluster	4 × × × 1	lamespace virtual-machines-d	lemo X 🔻 🗙 - Workload	I Name All	• × <mark>+</mark> 0	
	Explore		Alerts 🛕 0 💿 0 Deploy	rs 🖸 5 💿 0					
	Change Analysis								
	Network		Timeline						Bucket: 6 minutes
	Collectors		virtual-machines-demo >				00		00
٠	Workload Security		All Workloads in namespace						
	ONTAP Essentials			8:45 AM 9:00 AM	9:15 AM 9:30 AM	9:45 AM 10:00 AM	10:15 AM 10:30 AM	10:45 AM 11:00 AM	11:15 AM 11:30 AM
٩	Admin		Compare to: 📀	Changes					Last updated 04/19/2024 11:43:58 AM
			Kubernetes Infrastructure	Туре	Summary	Start Time	Duration	Triggered On : name	Status
			Nodes (1) 115 Changes and 0 Alerts	C Deploy	Attributes 'metadata.finalizers', 'metadata.finalizers[1]' changed	04/19/2024 11:40:31 AM	6 seconds	PersistentVolumeClaim: rhel9-demo-vm2	Complete
			Persistent Volumes (6) 8 Changes and 0 Alerts Kubernetes Resources	O Deploy	Attributes 'metadata.finalizers,-', 'metadata.finalizers[1]' changed	04/19/2024 11:40:36 AM	1 second	PersistentVolumeClaim: rhel9-demo-vm2-user-disk	Complete
			Security (2)	O Deploy	Created new object	04/19/2024 10:30:59 AM	18 seconds	PersistentVolumeClaim: rhel9-demo-vm2-user-disk	Complete
			a soorigea anno o roal 10	O Deploy	Created new object	04/19/2024 10:30:59 AM	18 seconds	PersistentVolumeClaim: rhel9-demo-vm2	Complete
•	Minimize			O Deploy	Created new object	04/19/2024 10:31:00 AM	17 seconds	PodDisruptionBudgettiv kubevirt-disruptionBbudge drivqs	ate compatows Lettings to activate Windows.

In the above example, Change Analysis is configured on the OpenShift cluster for the namespace that contains an OpenShift Virtualization VM. The dashboard shows changes against the timeline. You can drill down to see what changed and the click on All Changes Diff to see the diff of the manifests. From the manifest, you can see that a new backup of the persistent disks was created.

Tutorial 0% Complete Getting Star	rted 🔻			O Deploy Comp	leted					×
NetApp PCS Sandbox / Kubernetes / Cha		Summary Start Time	АМ	End Time	АМ	Duration 6 seconds				
Alerts 🔔 0 💿 0 Deploys O 5 💿 0				Triggered On Cop-cluster4 2 Cop-cluster4 2	> machines-demo > rhel9-demo-vm2 >	07,22,2024,22,403,7		Triggered On : kind PersistentVolumeClai	d m	
Timeline										-
virtual-machines-demo >				Changes (2)						_
				Attribute Name		Previous		New		
All Workloads in namespace			metadata.finalize	rs	-		snapshot.storage.kut source-protection	pernetes.io/pvc-as-		
	9:00 AM 9:1	5AM 9:30 AM		metadata.finalize	rs[1]	snapshot.storage.ki source-protection	ubernetes.io/pvc-as-	-		
Compare to: 🕜	Selected Changes (2)	X Deselect		All Changes Diff						
Kubernetes Infrastructure	Туре	Summary			2					-
Nodes (1) 116 Changes and 0 Alerts	O Deploy	Attributes 'metadata.finali; 'metadata.finali;		Event Logs	nts					
		changed		timestamp	severity	reason	involvedobject	involvedobject	message	
Persistent Volumes (6) 8 Changes and 0 Alerts Kubernetes Resources	O Deploy	Attributes 'metadata.finali; 'metadata.finali; changed		04/19/2024 10:30:59 AM	Normal	Provisioning	PersistentVolumeC laim	rhel9-demo-vm2	External provisioner is provisioning volume for claim	
Security (2) 2 Changes and 0 Alerts									"virtual-machines- demo/rhel9- demo-vm2"	
				04/19/2024 10:30:59 AM	Normal	Pending	DataVolume	rhel9-demo-vm2- user-disk1 Activate Windo	PVC rhel9-demo- vm2-user-disk1 Pending	
				04/19/2024	Normal	ImportSucceeded	DataVolume	GenteloSattingosma.act	Sate Windows.	

All Chan	ges Diff				×
Previous		New			A
	Expand 45 lines				
46	kind: DataVolume	46		kind: DataVolume	
47	name: rhel9-demo-vm2	47		name: rhel9-demo-vm2	
48	uid: dcf93b7a-71bc-409b-ad12-4916d05e0980	48		uid: dcf93b7a-71bc-409b-ad12-4916d05e0980	- 1
49	- resourceVersion: " 8569671 "	49	+	resourceVersion: " 8619670 "	- 1
50	uid: 953a4188-5932-46ac-85d7-9734acc78278	50		uid: 953a4188-5932-46ac-85d7-9734acc78278	
51	spec:	51		spec:	
52	accessModes:	52		accessModes:	- 1
	Expand 15 lines				-

Backend Storage Mapping

With Cloud Insights, you can easily see the backend storage of the VM disks and several statistics about the PVCs.



You can click on the links under the backend column, which will pull data directly from the backend ONTAP storage.

← → C ≤ ps1325.c01.cld	C 😂 ps1325.c01.cloudinsights.netapp.com/web/#/assets/internalVolumes/1119122001?timeRange=THREE_HOURS							
	s Cutorial 0% Complete Getting Star	ted 🔻		م	¢ 0	😫 Su	ndhar Banu 🔻	
0bservability	NetApp PCS Sandbox / 🔽 ntaphci-a3006	9u25:zoneb:trident_pvc_953a4188_59	32_46ac_85d7_9734acc78278	C Last 3 Hours	•	0	🖉 Edit 🔻	
G Kubernetes	•				Acquired	d a minute	ago, 12:06 PM	
Workload Security	Internal Volume Summary		C 5m	User Data		+ A	nnotation	
ONTAP Essentials	Storage: ntaphci-a300e9u25	Total Capacity (GiB): 31.7 GiB	Deduplication Savings: 3.0 %	Application(s) None				
Admin	Storage Pool: ntaphci-a300-01:EHCAggr01	Used Capacity (GiB): 1.2 GIB	Thin Provisioned: Yes	IOD Service Level Standard				
	Storage Virtual Machine: zoneb Status: Online Type: FlexClone UUID: ad55a9e0-fe59-11ee-a551-00a098b46a21	Snapshot Reserve: 0.0 GH Latency - Total: 0.65 mS 0.65 mS Storage Pool Utilization: 0.23 % IOPS - Total: 0.23 10/s Datastore:	Replication Source(s): ntaphci-a300e9u25:zoneb:trident_pvc_dc5 Alert Monitors: 5. UBS - AlOps Abnormal Spike in Internal Volume IOPs ajtest Show All (26) <{ View Topology	IOD SL Standard Tier Tier 1 SSD flexvols zz_Recommended_Instance_Type, S3 Glacier recommended instanc	,AWS			
	Expert View latency.total (ms)		Display Metri	Resource Resource Number in taphol-a334acc782 Workload Contention Number in taphol-a3OTS_No	;78 ode2	Hide Res	ources	
	0 11:00 AM	11:10 AM 11:20 AM 11:3	0 AM 11:40 AM 11:50 AM 12:00 PM	Additional Resources	B_2		57%	
Minimize	iops.total (IO/s) 2			Q Search Assets	ttings to acti			

Another way to look at all the pod to storage mapping is creating an All Metrics query From Observability menu under Explore.

al	Observability	•	NetApp PCS Sandbox / Observability / Explore /	All Metric Queries / persistent o	lisks		C	Last 3 Hours	🖨 Save
	Explore		Object kubernetes.pod_to_storage × •						
	Alerts		Filter by Attribute - kubernetes_cluster ocp-cluster Filter by Metric +	x x x + 0					
	Collectors		Group By kubernetes.pod_to_storage X × *]					
	Log Queries		Formatting:	al Formatting Background Color *	• Show 🕲 In Range as gre	een			
	Enrich		6 items found						20
			Table Rose Grouping	Hetrica & Attributes					
	Reporting		kubernetes.pod_to_storage †	persisten : workload :	namespace :	storageVirt :	InternalVol i volume.na	qtree.name i timeToFull i	backen
~		12	importer-prime-4f1b8351-2678-4295-b9db-64	pvc-d4cceecc-24b	openshift-virtualization-os-imag	e zoneb	ntaphci-a300e9u25	3d72704c-6108-11e 0.00	0.16
0	Kubernetes	'	importer-prime-8f792a30-02bb-4e86-a8a8-d6	pvc-d50f58e7-3cf1	openshift-virtualization-os-imag	e zoneb	ntaphci-a300e9u25	3d72704c-6108-11e 0.00	0.16
	Workload Security		virt-launcher-rhel9-demo-vm2-pdngg	pvc-98e342c0-20e	virtual-machines-demo	zoneb	ntaphci-a300e9u25	3d72704c-6108-11e 0.00	0.00
			virt-launcher-rhel9-demo-vm2-pdngg	pvc-953a4188-593	virtual-machines-demo	zoneb	ntaphci-a300e9u25	3d72704c-6108-11e 0.00	3.88
III	ONTAP Essentials		virt-launcher-rhel9-demo-vm2-rnzjj	pvc-f4d1adc3-314	virtual-machines	zoneb	ntaphci-a300e9u25	3d72704c-6108-11e 0.00	3.88
۵	Admin		virt-launcher-rhel9-demo-vm2-rnzj)	pvc-ad805a7b-4at	virtual-machines	zoneb	ntaphci-a300e9u25	3d72704c-6108-11e 0.00	0.00

Clicking on any of the links will give you the corresponding details from ONTP storage. For example, clicking on an SVM name in the storageVirtualMachine column will pull details about the SVM from ONTAP. Clicking on an internal volume name will pull details about the volume in ONTAP.

	storageVirtualMachin	internalVolume.name volume.na
zation-os-image	zoneb 🗇	ntaphci-a300e9u25:zoneb:trident_p
zation-os-image	zoneb	ntaphci-a300e9u25:zoneb:trident_p
demo	zoneb	ntaphci-a300e9u25:zoneb:trident_p
demo	zoneb	ntaphci-a300e9u25:zoneb:trident_p
6	zoneb	ntaphci-a300e9u25:zoneb:trident_p
	zoneb	ntaphci-a300e9u25:zoneb:trident_p



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