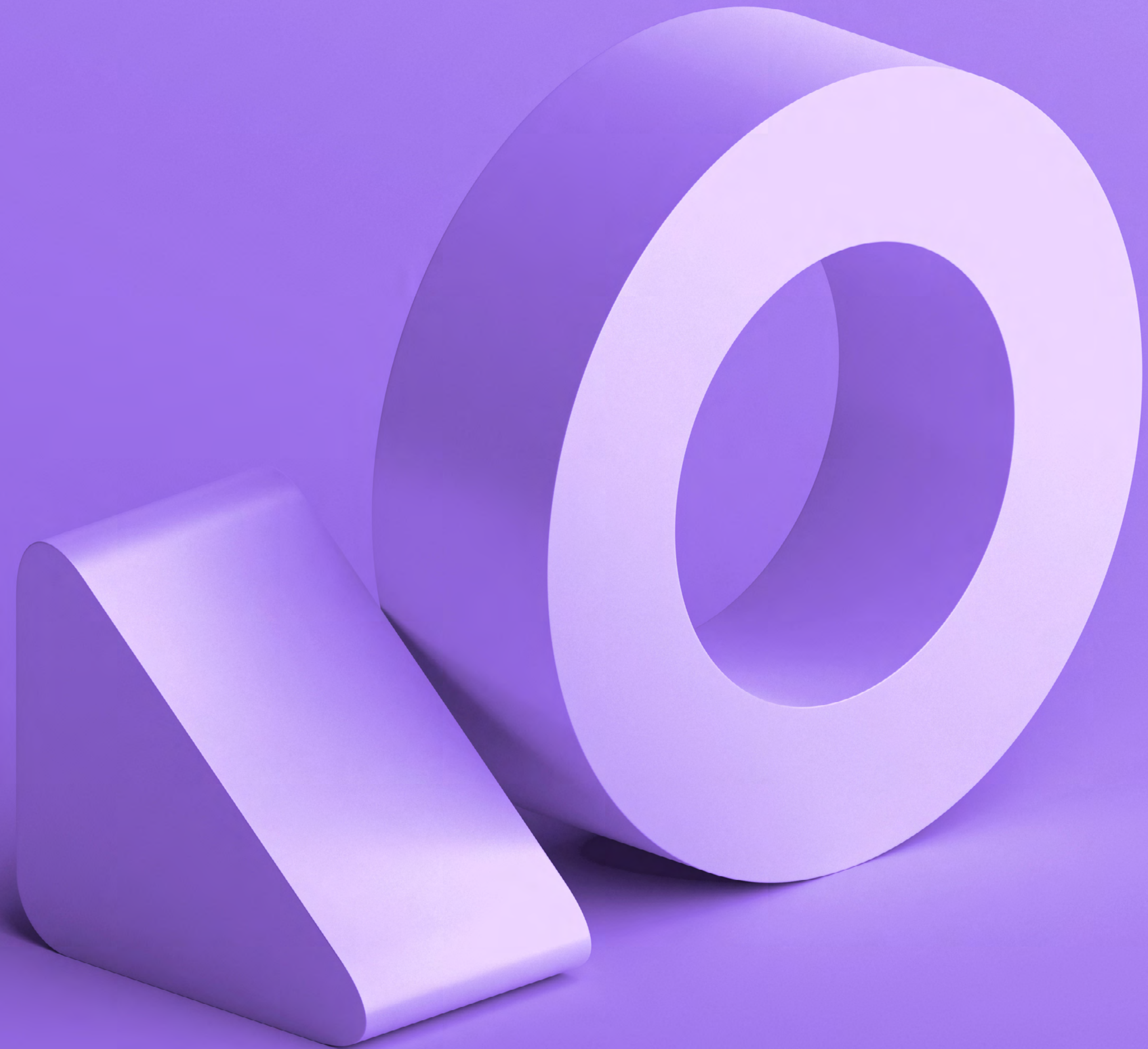


EBOOK

# Ported your application to the cloud—now optimize and modernize

[bluexp.netapp.com/cloud-insights](https://bluexp.netapp.com/cloud-insights)







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# 1. Find unused resources



[Watch video on Cloud Insights](#)

## Cost control in the cloud

For most enterprises, completing a cloud migration is just the first step in the cloud journey. You will probably need to modernize existing applications to take advantage of the cloud environment, and you may also be bringing new, cloud-native applications online. For IT teams, this means a lot to keep track of—especially when using new and unfamiliar tools.

NetApp® Cloud Insights is a unique hybrid cloud monitoring tool that gives you visibility and insight across data center and cloud environments. Cloud Insights helps you keep tabs on everything in a new cloud environment and makes it easier for IT teams to stay relevant as they transition from data center to cloud.

This e-book explores how Cloud Insights can help facilitate application modernization, ensure continuity of operations, and deliver greater cloud success. It explains how Cloud Insights helps you to:

- Achieve greater cost control
- Democratize access to information
- Incorporate containers and Kubernetes into your operations

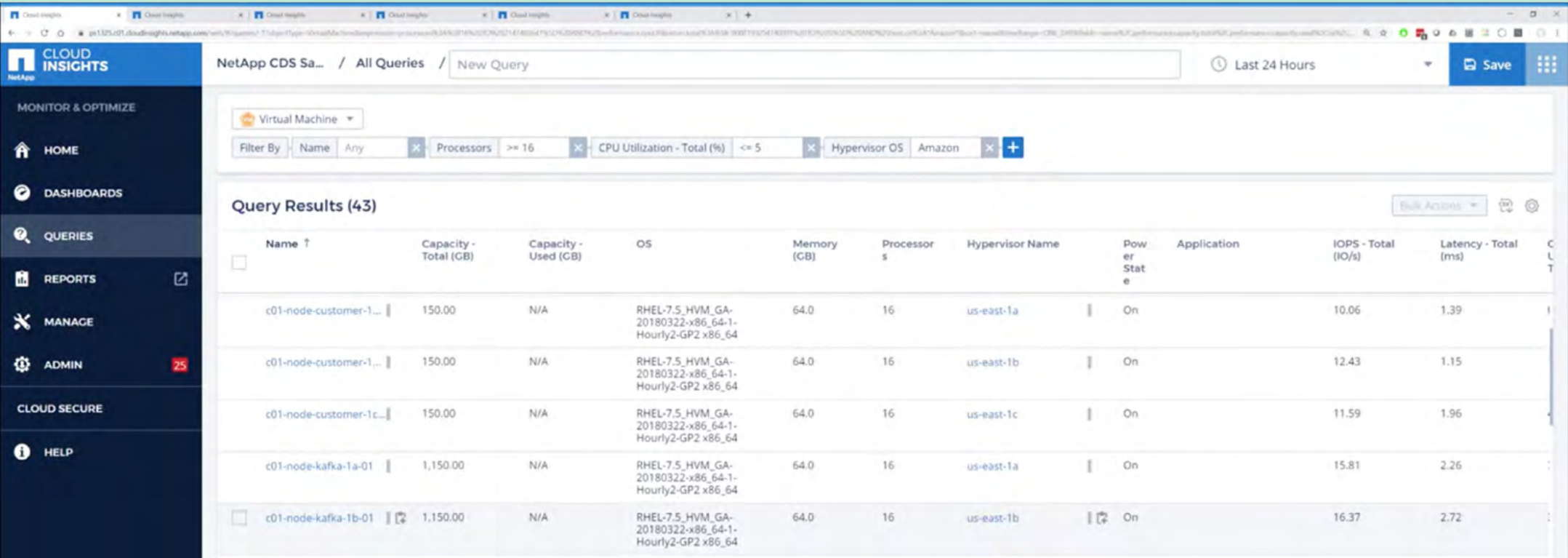
### Cloud Insights can help you to

- Monitor your cloud and on premises systems with a single tool
- Find performance issues 5 times faster
- Optimize your growing cloud spend and save up to 30%

# Find unused resources

The public cloud offers a wide range of services and capabilities, and potentially unlimited access to infrastructure resources that can enable developers to do all sorts of new things very quickly. However, if you're responsible for controlling cloud spending, these services can create new challenges. Cloud Insights makes it easy to find and eliminate waste.

Cloud Insights provides a flexible query mechanism that lets you search for resources at a granular level based on a wide range of criteria using flexible filters and finders. Using queries, you can quickly find over provisioned and underutilized virtual machines (VMs). Figure 1 shows a search for VMs with a large number of processors and low CPU utilization running the Amazon hypervisor (that is, VMs in AWS).



The screenshot shows the NetApp Cloud Insights web interface. The left sidebar contains navigation links: HOME, DASHBOARDS, QUERIES, REPORTS, MANAGE, ADMIN (with a red '25' badge), CLOUD SECURE, and HELP. The main panel is titled 'NetApp CDS Sa...' and shows a query for 'Virtual Machine'. The filters applied are: 'Processors >= 16', 'CPU Utilization - Total (%) <= 5', and 'Hypervisor OS Amazon'. The query results show 43 items. The table below lists the first five results.

Name	Capacity - Total (GB)	Capacity - Used (GB)	OS	Memory (GB)	Processors	Hypervisor Name	Power State	Application	IOPS - Total (IO/s)	Latency - Total (ms)
c01-node-customer-1...	150.00	N/A	RHEL-7.5_HVM_GA-20180322-x86_64-1-Hourly2-GP2_x86_64	64.0	16	us-east-1a	On		10.06	1.39
c01-node-customer-1...	150.00	N/A	RHEL-7.5_HVM_GA-20180322-x86_64-1-Hourly2-GP2_x86_64	64.0	16	us-east-1b	On		12.43	1.15
c01-node-customer-1c...	150.00	N/A	RHEL-7.5_HVM_GA-20180322-x86_64-1-Hourly2-GP2_x86_64	64.0	16	us-east-1c	On		11.59	1.96
c01-node-kafka-1a-01	1,150.00	N/A	RHEL-7.5_HVM_GA-20180322-x86_64-1-Hourly2-GP2_x86_64	64.0	16	us-east-1a	On		15.81	2.26
c01-node-kafka-1b-01	1,150.00	N/A	RHEL-7.5_HVM_GA-20180322-x86_64-1-Hourly2-GP2_x86_64	64.0	16	us-east-1b	On		16.37	2.72

Figure 1. Query to find large AWS compute instances with low utilization.

# Find unused resources

## Using custom dashboards

You can also create custom dashboards specifically to identify and track wasted resources. Figure 2 shows a dashboard that finds and tracks wasted compute instances (EC2 instances) and unused or orphaned block storage (EBS) capacity in AWS.

### What to do when you find waste

There are a number of possible actions you can take when wasted resources are found:

- Export the list to a file and send it to the bill payer for follow up.
- Drill down on each item, identify the owner, and contact them directly.
- Tag each resource and monitor over time to see if it remains underutilized.

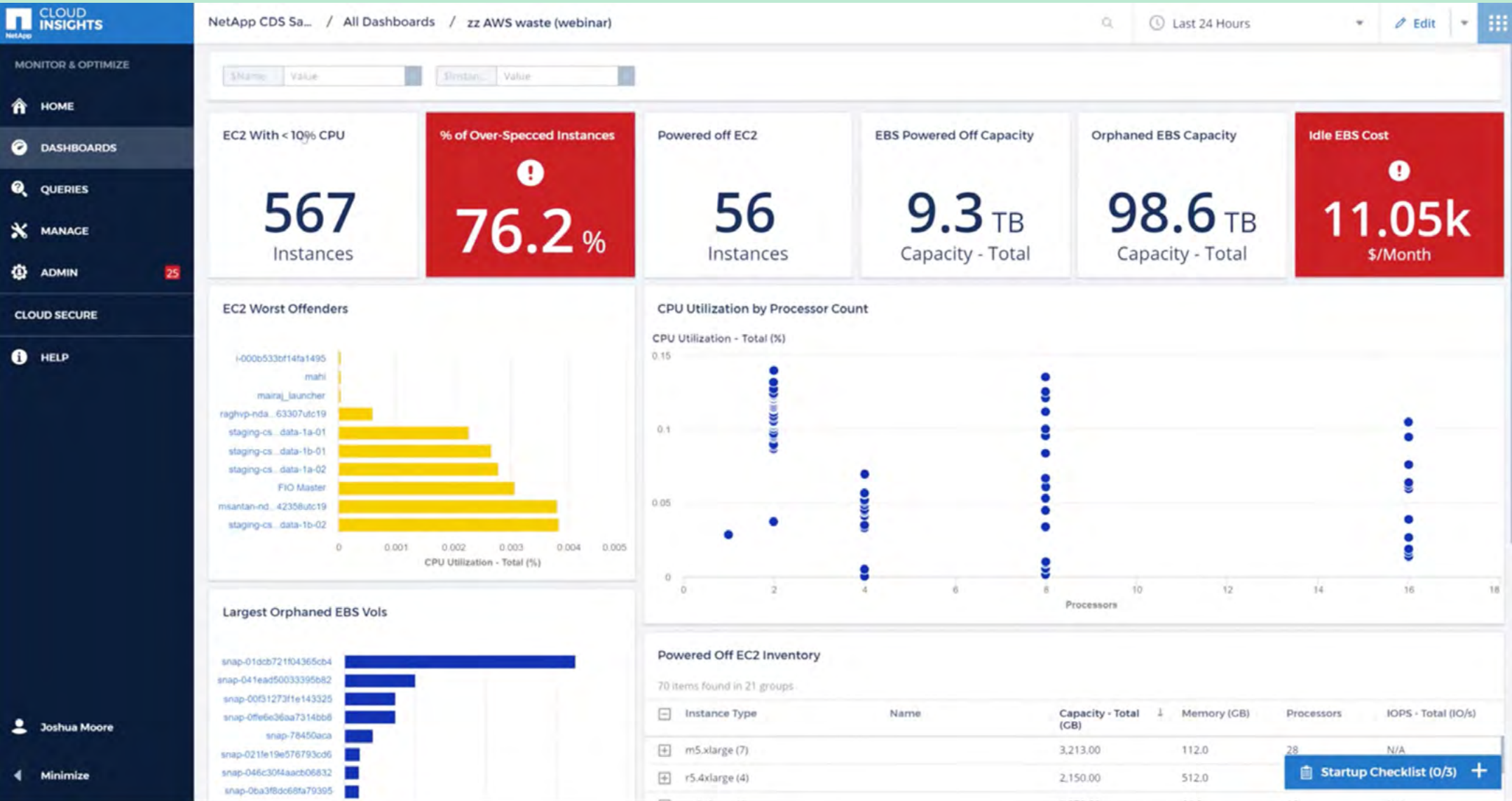


Figure 2. Example Cloud Insights dashboard showing waste in AWS.



# Find unused resources

## Chargeback and shameback

Using Cloud Insights metadata, you can associate each individual resource with a creator to enable reporting at varying levels of granularity all the way down to individual users, as shown in the sample dashboard in Figure 3.

Typical showback and chargeback reports don't provide visibility down to the individual user. This Cloud Insights capability empowers users to control their own usage. Users can see the information they need in order to clean up after themselves. Even users who aren't normally conscientious typically don't want their names to be visible at the top of the list and modify their behavior accordingly.

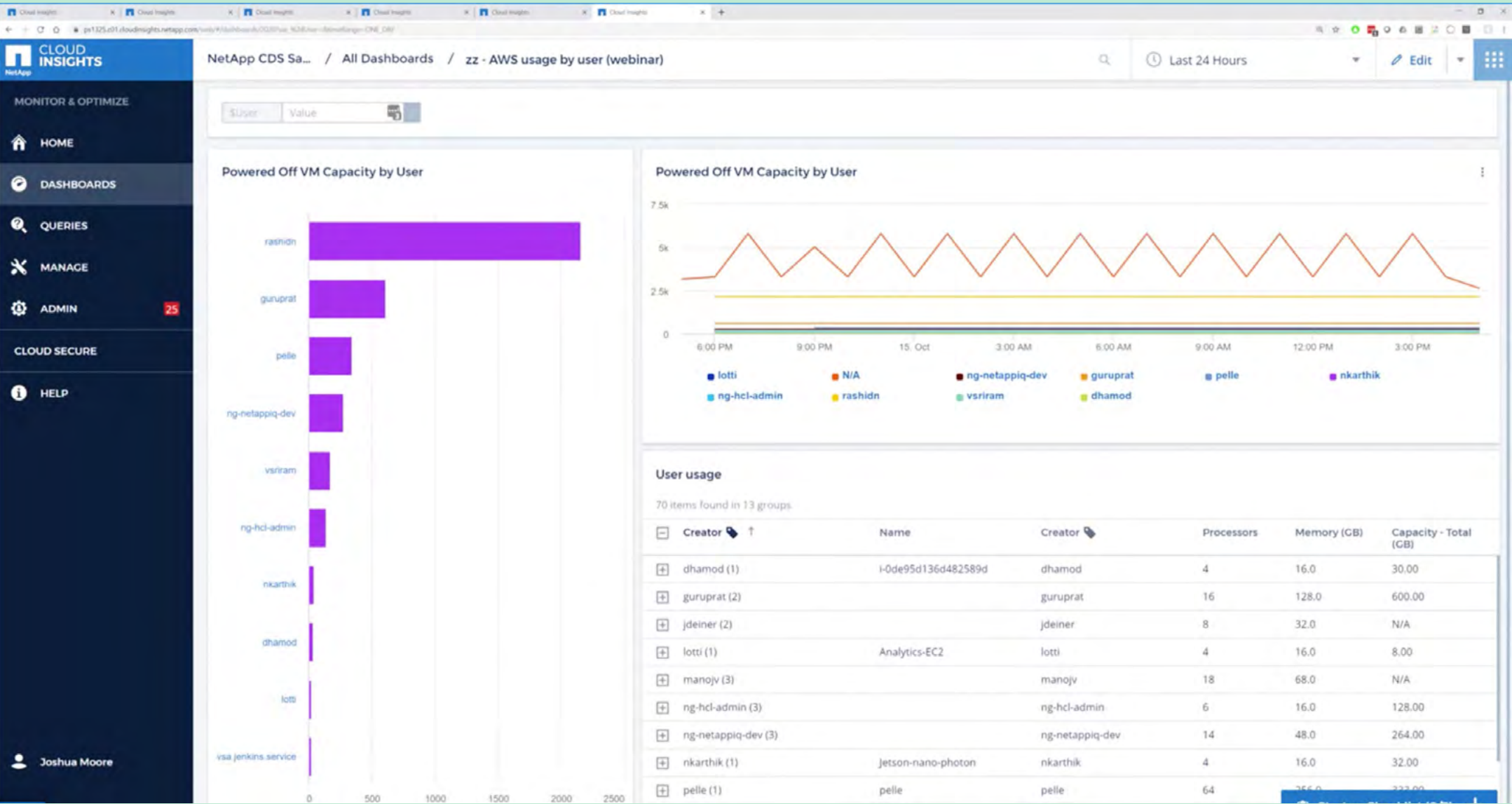


Figure 3. Example Cloud Insights dashboard showing waste by user.

## 2. Democratizing access to information

If your IT team is relatively new to the cloud, incorporating Cloud Insights as part of your operations prior to migration can help to ensure that your team remains effective after migration—and continues to be effective as you add cloud-native capabilities.

Cloud Insights enables infrastructure and application admins to operate in the new environment immediately. And if you're moving to hybrid cloud operations spanning both private and public cloud, or if you're running applications or using services in more than one public cloud, Cloud Insights offers a single tool with visibility across all environments.

The cloud enables developers to use a lot of new platforms and services that IT teams may not be familiar with, increasing complexity and dynamism versus the data center environment. Cloud Insights empowers all parties to be more effective.

For example, an application owner can create a dashboard showing the key performance indicators (KPIs) for a web application, as shown in Figure 4. These KPIs might be relatively meaningless to an infrastructure admin or a database admin (DBA). However, without any context or prior knowledge of the application, anyone can see that it's in trouble because of the threshold breach in red.

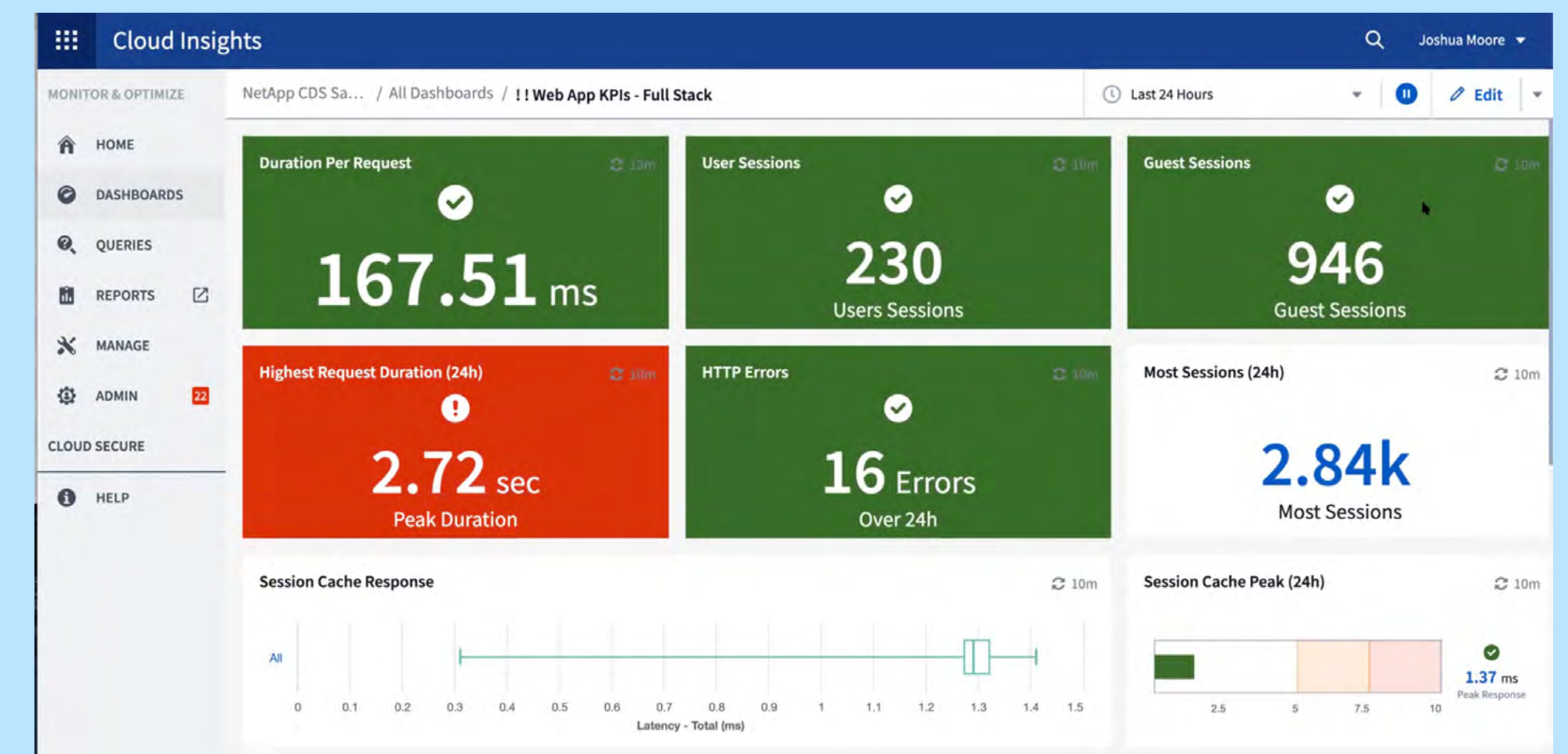


Figure 4. Dashboard showing KPIs for a web application.



# Democratizing access to information

The same Cloud Insights dashboard can incorporate additional views, democratizing information across the IT stack. An infrastructure admin or DBA may not understand the top-level KPIs, but other KPIs in the same dashboard enable them to monitor and troubleshoot. The approach is simply to look for red and connect the dots.

For example, if an infrastructure admin sees something in red at the top of the dashboard, they can scroll down and see at a glance whether there's an infrastructure problem that they can correct, or if they need to involve someone with specific database or Kubernetes expertise.

In the example from Figure 4, it's clear that something is causing the peak request duration to tip into the red. Scrolling down, it's also apparent that the MySQL Buffer Pool is being maxed out, as shown in Figure 5.

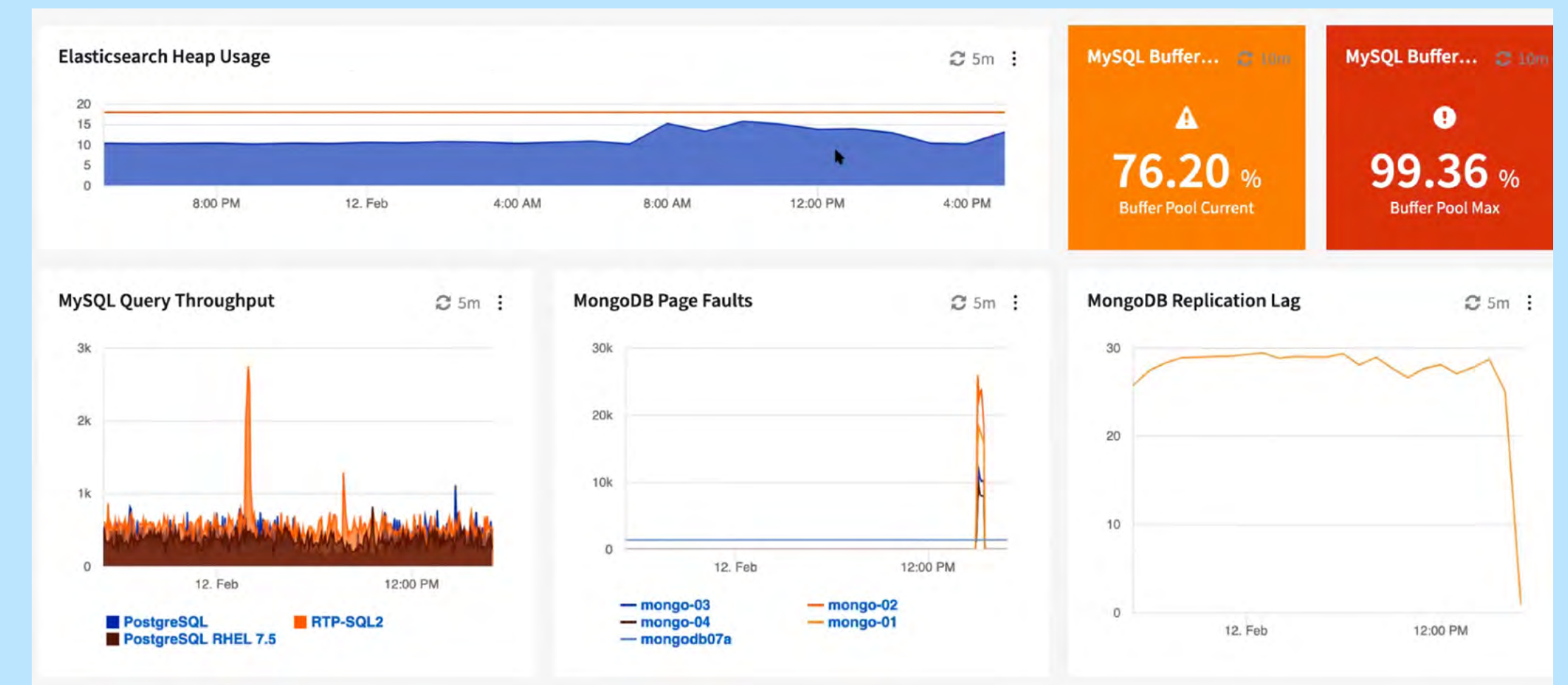


Figure 5. Database section of the dashboard for the example web application.



# Democratizing access to information

Looking further, it's clear that this problem is also causing Kubernetes to have an unusually high number of restarts, as shown in Figure 6. (More on Kubernetes in the next section.)

And finally, turning to the VM and storage panes of the dashboard, some on-premises VMs are experiencing high latency, and storage IOPS have approached a threshold as well, as shown in Figure 7.

From this point, an infrastructure admin can drill down quickly into the details of high-latency VMs to understand whether there's an infrastructure resource problem that can be addressed to resolve the top-level application problem.

Dashboards like this one enable everyone on the team to be more effective, even in complex and rapidly changing environments. The general approach is to start at the top and scroll down to the last section of the dashboard that is showing red, and then drill down to understand what's happening. This approach increases everyone's effectiveness regardless of skill set, reducing mean time to repair if problems arise.

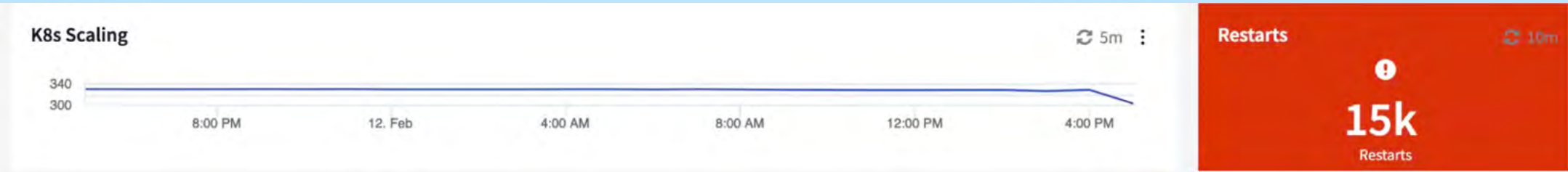


Figure 6. Kubernetes section of the dashboard for the example web application.

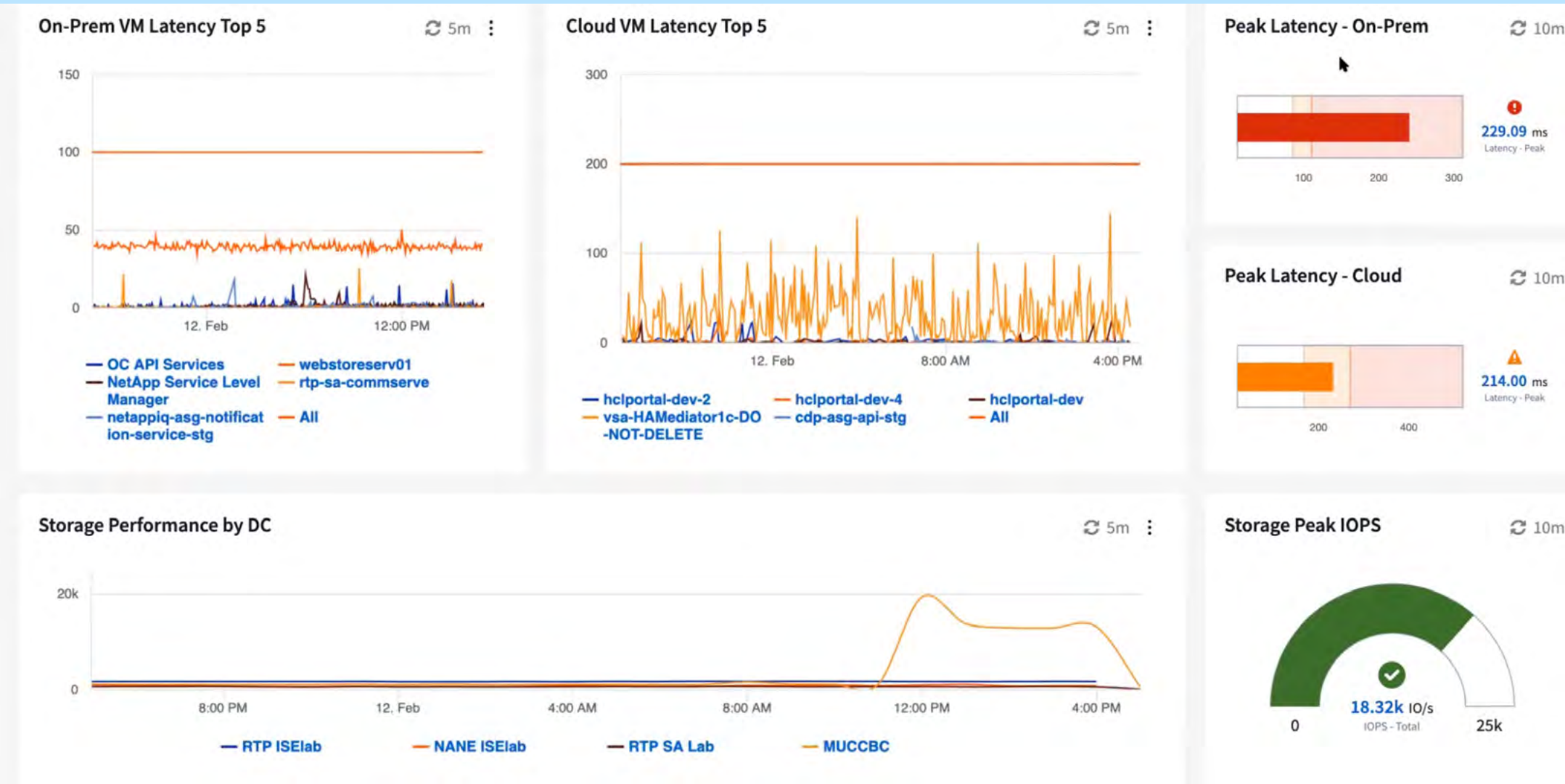


Figure 7. VM and storage section of the dashboard for the example web application.



### 3. Incorporating Kubernetes into your operations

Microservices and containers are synonymous with application modernization. Many enterprises are incorporating Kubernetes into production IT operations to support cloud-native applications running in containers. However, Kubernetes experts are in short supply. Your organization may have only one or two—if it has any at all.

Cloud Insights enables the same connect-the-dots troubleshooting approach to enable teams to monitor and manage Kubernetes. Returning to the example from the previous section, the Kubernetes restarts being reported could be a symptom of resource exhaustion or a problem with the application itself. Resource exhaustion typically shows up in a lower layer of the dashboard, as it did in Figures 5, 6, and 7.

Cloud Insights incorporates specific Kubernetes tools and views to enable non-experts to be more effective in Kubernetes environments. The Kubernetes cluster explorer provides an overview of all Kubernetes clusters in your environment, as shown in Figure 8.

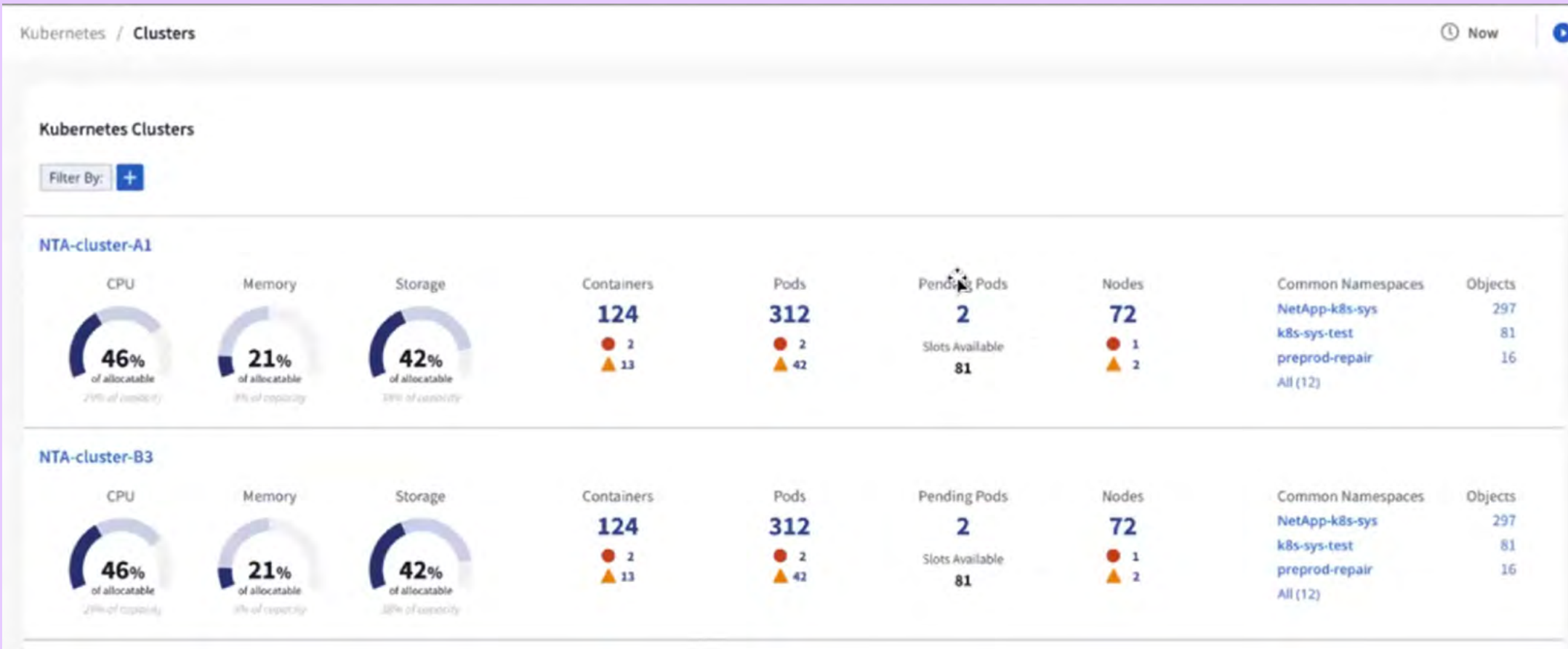


Figure 8. Overview showing a summary of all Kubernetes clusters.



# Incorporating Kubernetes into your operations

From this view, you can drill down to see an intuitive “exploded” view of any single cluster that’s reporting problems.

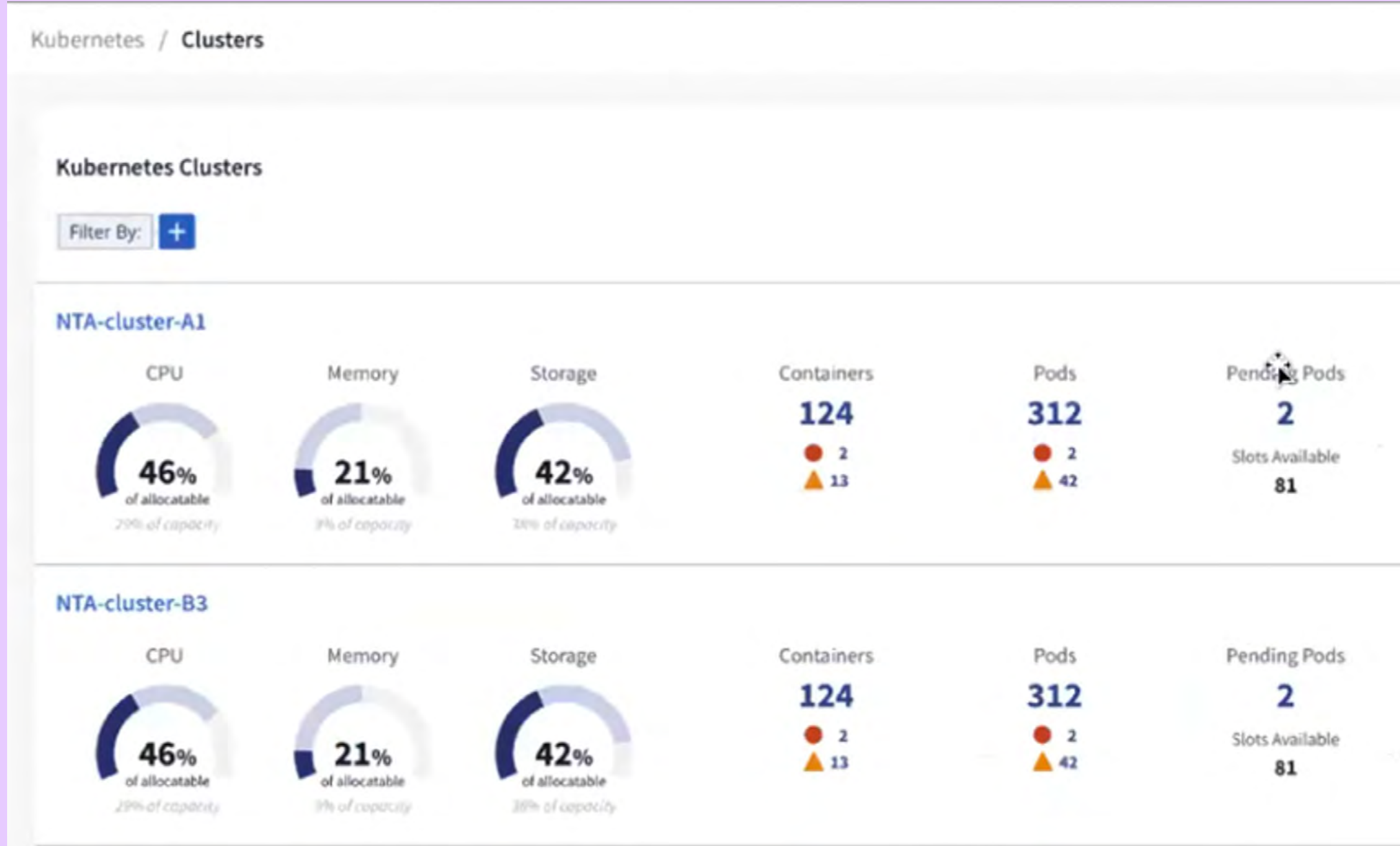


Figure 9. Exploded view of a Kubernetes cluster.

You can also drill down further on anything that’s red (see Figure 10) to get actionable information without having to be a Kubernetes expert.

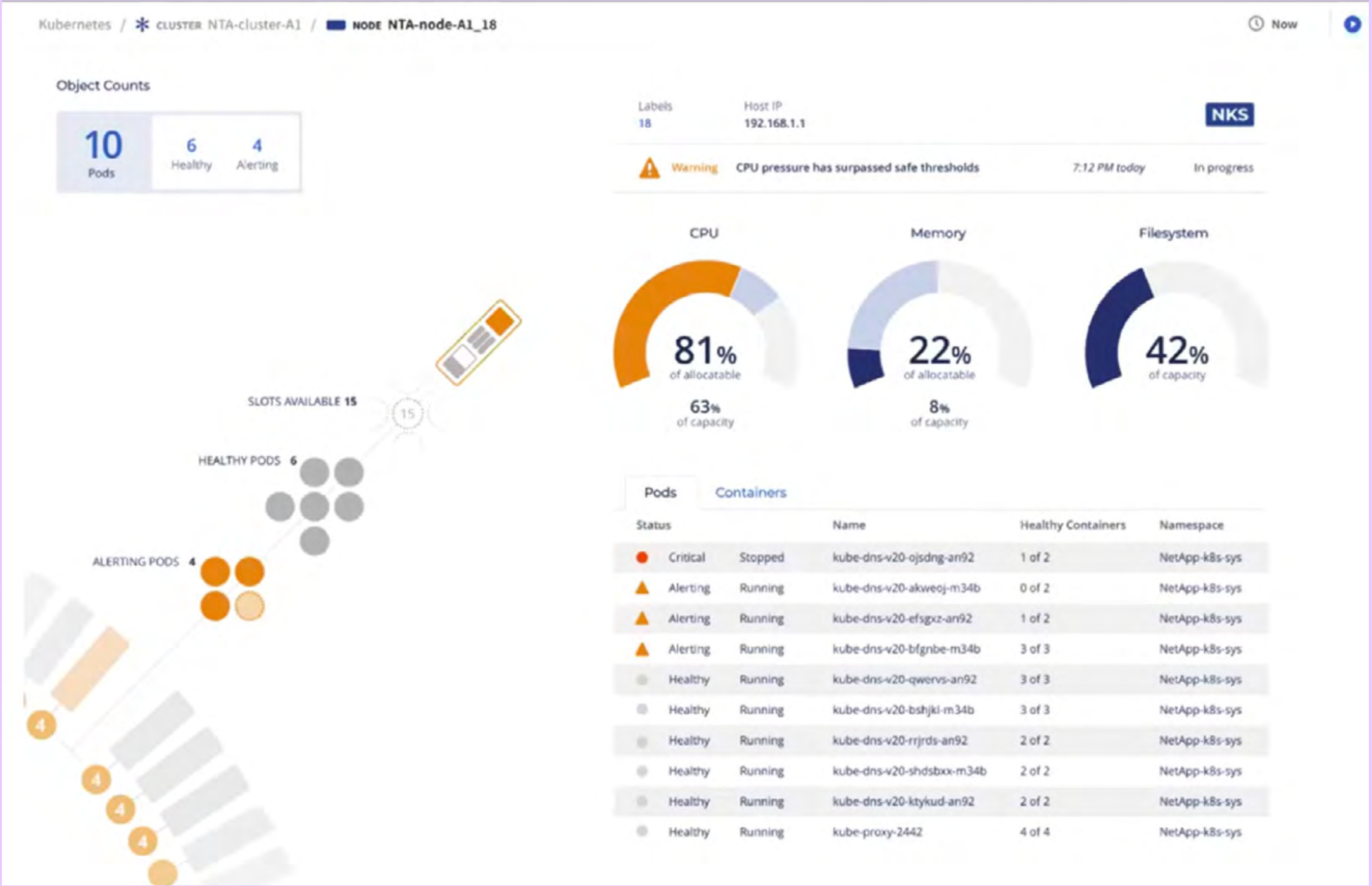


Figure 10. Drilling down on a Kubernetes cluster.

These capabilities enable all admins to apply their skills in the cloud environment, smoothing the learning curve during retraining. Cloud Insights provides intuitive views of modern applications that are immediately useful to all stakeholders as they learn how the applications work and how to manage them.



# Incorporating Kubernetes into your operations

## Kubernetes storage in the cloud

Containers deployed with Kubernetes are helping to accelerate the development and delivery of new cloud-native applications while enabling the modernization of existing ones. Although containers aren't designed to be persistent, the data they rely on or create usually is.

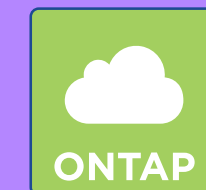
NetApp cloud storage services provide a persistent, fully managed, cost-effective, and secure storage environment for containers. These services offer flexibility for users to consume storage according to their needs, by delivering elasticity, scalable performance, and shared file access across multiple cloud providers and regions.

Trident is a fully supported open-source project that automates the provisioning of persistent storage for stateful applications, allowing users to dynamically increase or decrease performance based on workload needs.

### Find out more:



- [NetApp Cloud Volumes Service for AWS](#)



- [NetApp Cloud Volumes ONTAP for Kubernetes](#)



- [NetApp Trident](#)



## 4. Getting started with Cloud Insights

This e-book explains ways that Cloud Insights helps IT teams control cloud costs and ensure their effectiveness in the cloud environment. Even as you undertake application modernization, Cloud Insights makes your IT team more effective and efficient. To see Cloud Insights in action for yourself, register for a 30-day free trial. Go to NetApp Cloud Central at <https://bluexp.netapp.com/cloud-insights> to learn more about NetApp Cloud Insights and start your free trial.

### Additional resources

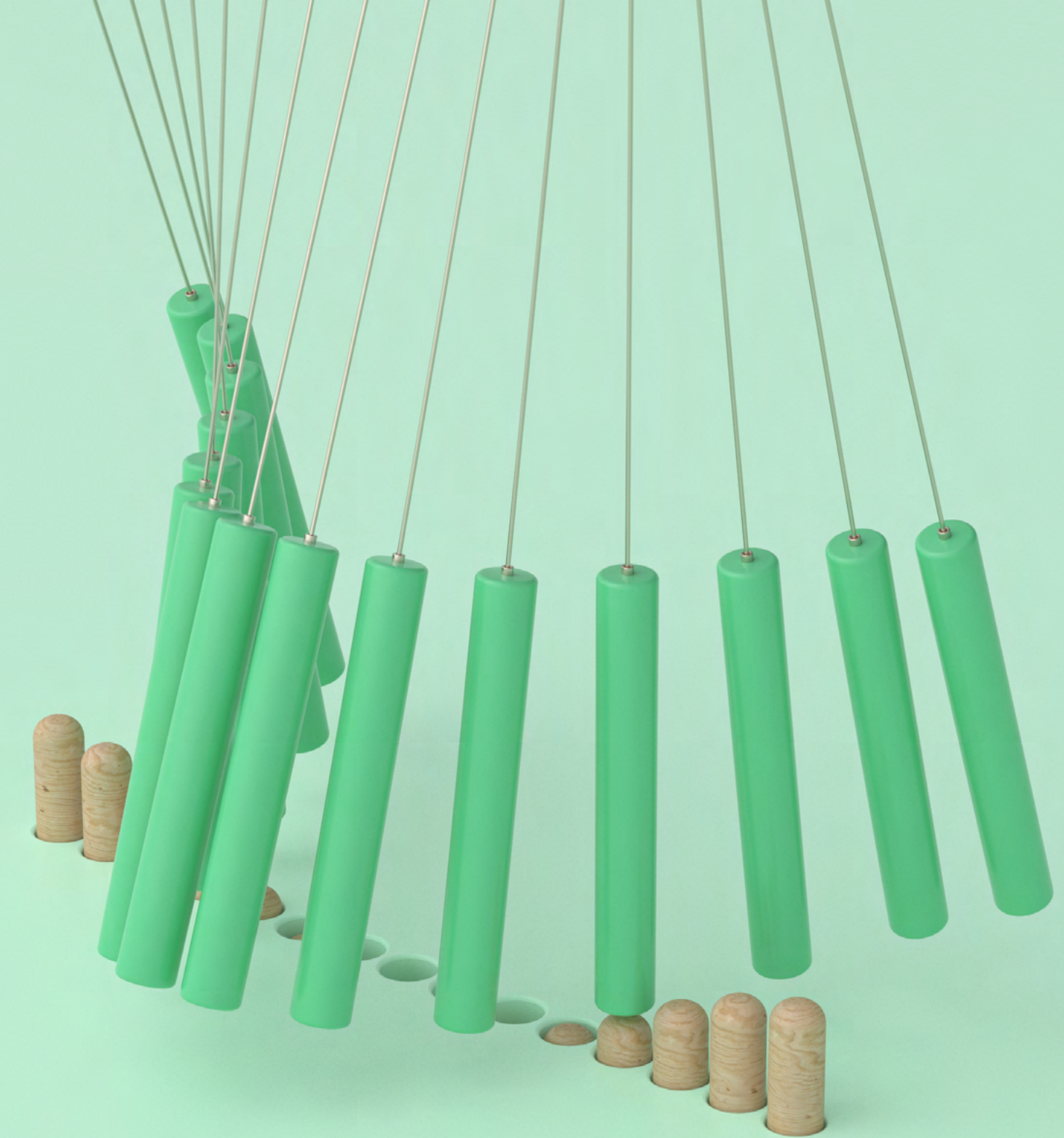
- [Hosting Legacy Apps in the Cloud: Is it Possible?](#)
- [Why Is Monitoring Modern IT Infrastructures So Hard? Part 1](#)
- [Why is Monitoring IT Infrastructure So Hard? Part 2](#)



## 5. About NetApp

NetApp is the leader in cloud data services, empowering global organizations to change their world with data. Together with our partners, we are the only ones who can help you build your unique data fabric. Simplify hybrid multi-cloud and securely deliver the right data, services, and applications to the right people at the right time.

➔ Learn more at [www.netapp.com](https://www.netapp.com)



### About NetApp

In a world full of generalists, NetApp is a specialist. We're focused on one thing, helping your business get the most out of your data. NetApp brings the enterprise-grade data services you rely on into the cloud, and the simple flexibility of cloud into the data center. Our industry-leading solutions work across diverse customer environments and the world's biggest public clouds.

As a cloud-led, data-centric software company, only NetApp can help build your unique data fabric, simplify and connect your cloud, and securely deliver the right data, services, and applications to the right people—anytime, anywhere.