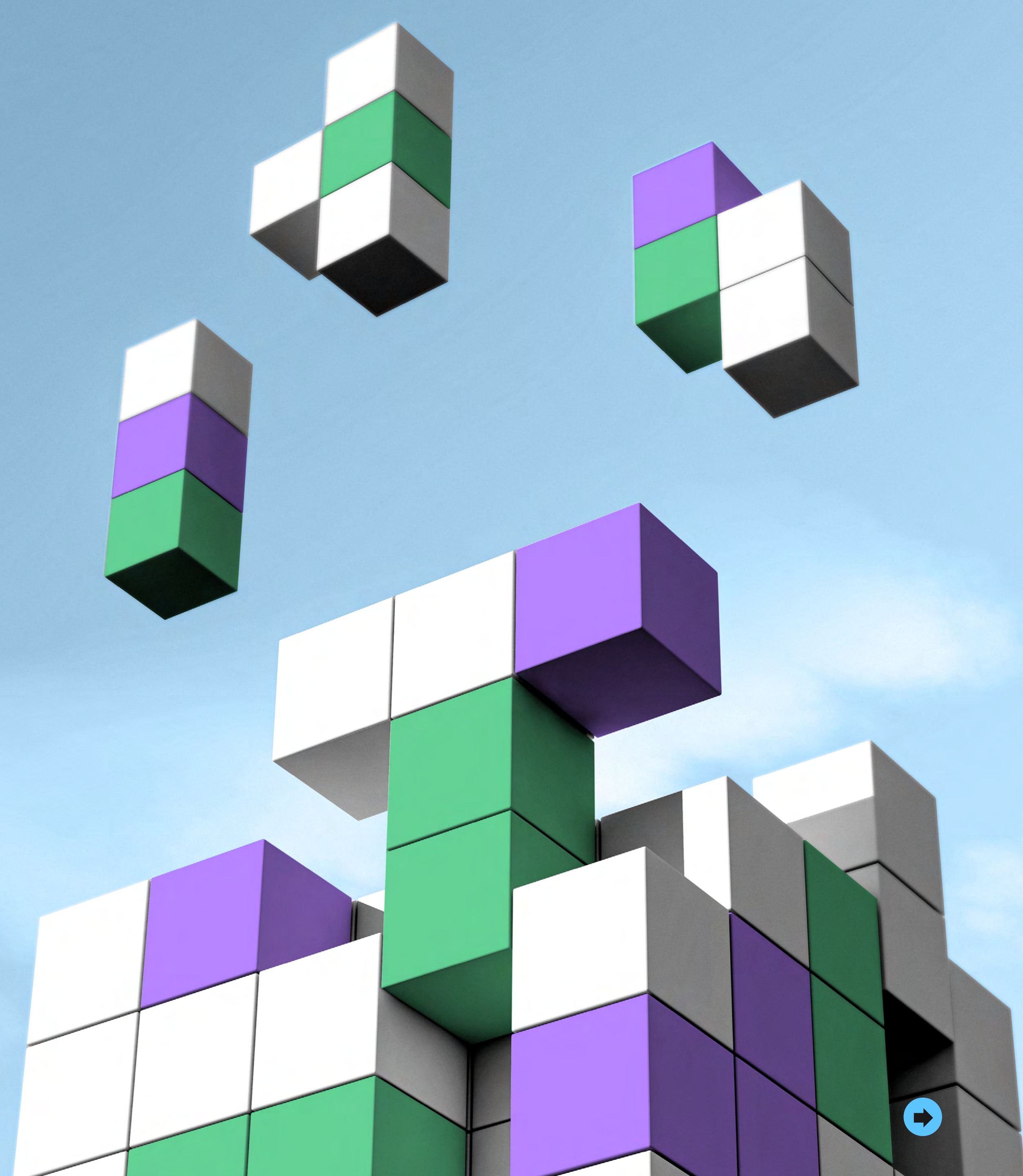


EBOOK

Planning and executing a cloud migration

 **NetApp**





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1. Simplifying application migration

Cloud migration can be a challenging and error-prone operation. The efficiency of the migration process is critical, and you have to be able to move applications without experiencing post migration performance or availability challenges. You also need to be able to manage and monitor applications in the new environment immediately.

 [Watch Cloud Insights video](#)

NetApp® Cloud Insights is a unique hybrid cloud monitoring tool that gives you visibility and insight across both data center and cloud environments, simplifying migrations, reducing stress on IT teams, and helping ensure continuity of operations.

This e-book explores how Cloud Insights and other NetApp cloud solutions can help you execute your migration, simplifying the process from start to finish. NetApp Cloud Insights includes a number of capabilities to make migration easier. This e-book explains how:

- Cloud Insights annotations simplify migration tasks
- Continuous monitoring reduces migration risk
- A single tool set simplifies operations before, during, and after migration

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%

2. How annotations can help

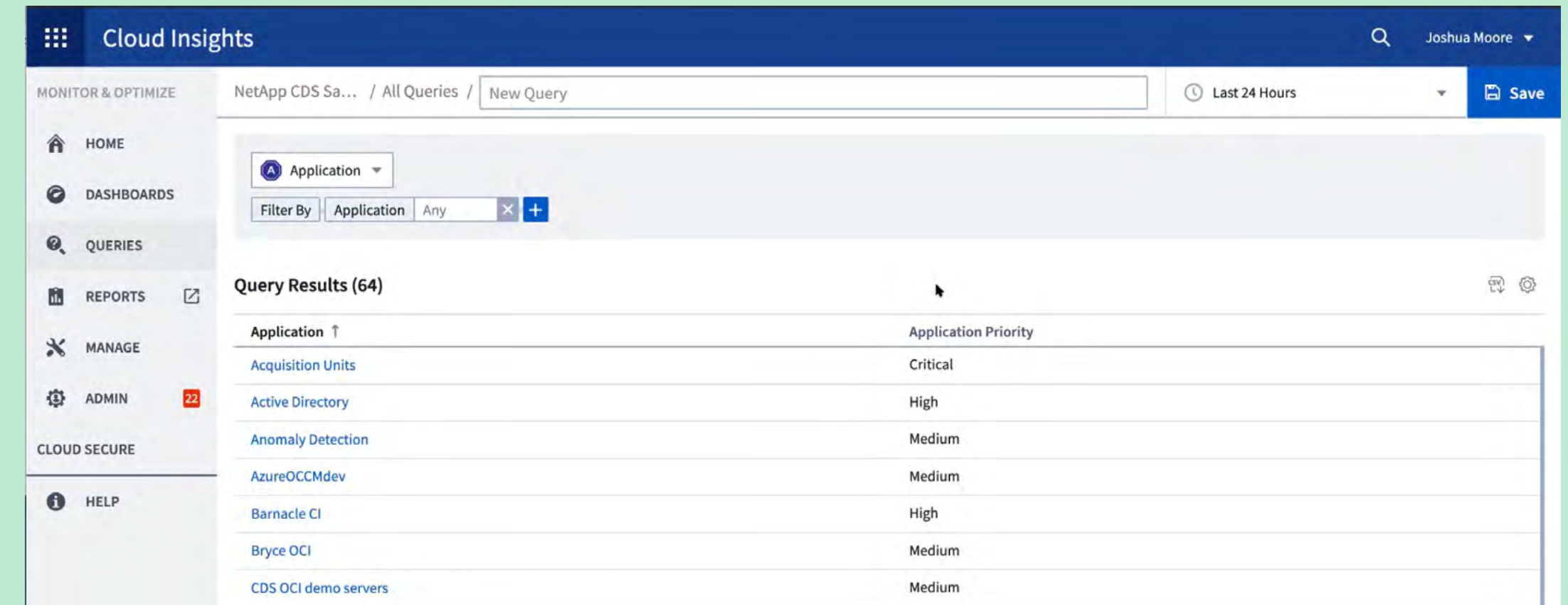
The most critical part of a cloud migration is determining the best way to move existing applications into the cloud. It may be tempting to try to move everything all at once, but it usually makes better sense to plan and execute a migration application by application. It's a good idea to migrate low-priority applications first to get familiar with the processes and tools required on both ends of the migration before you move critical applications.

Cloud Insights annotations allow you to assign priorities to each application, making it easy to identify groups of applications by priority. The flexible annotation engine enables you to address different business needs and circumstances. An annotation could be based on something simple like the name of the resource. For instance, in your environment anything with ora in the name may belong to Oracle, or you may know

that any resource provisioned by a particular team is part of a custom application. Annotating applications prior to migration can simplify migration processes and ensure that you don't overlook any important application resources.

Annotation can be accomplished in several ways. Automatic annotation rules can be used to annotate application components. Many IT teams use a configuration management database such as ServiceNow as a central metadata repository. This metadata can be imported into Cloud Insights, reducing effort and ensuring consistency. Cloud Insights also imports public cloud tags automatically.

Once applications are annotated, you can view a list of your applications with a simple query, as shown in Figure 1.



The screenshot shows the Cloud Insights interface. The top navigation bar includes the Cloud Insights logo, a search icon, and the user name 'Joshua Moore'. Below the navigation bar, there's a section for 'MONITOR & OPTIMIZE' with a search bar containing 'NetApp CDS Sa...' and a 'New Query' button. A filter dropdown is set to 'Application' and a filter by 'Application' is applied. The main content area displays 'Query Results (64)' with a table listing applications and their priorities.

Application ↑	Application Priority
Acquisition Units	Critical
Active Directory	High
Anomaly Detection	Medium
AzureOCCMdev	Medium
Barnacle CI	High
Bryce OCI	Medium
CDS OCI demo servers	Medium

Figure 1. A simple query finds all annotated applications in your environment.

How annotations can help

For example, suppose that you want to migrate a low-priority data archiving application. You can click its entry in the query results to drill down to the application page, as shown in Figure 2. From this page, you can view a lot of information about the application, including its topology, performance metrics, and more. Scrolling down the page, you can also see associated virtual machines and storage resources (not shown in the figure).

With the full list of resources associated with your application, you can see at a glance what needs to be migrated. If you haven't done so already, you can immediately determine whether VMs need to be rightsized during migration and decide on the appropriate tier of storage for each volume.

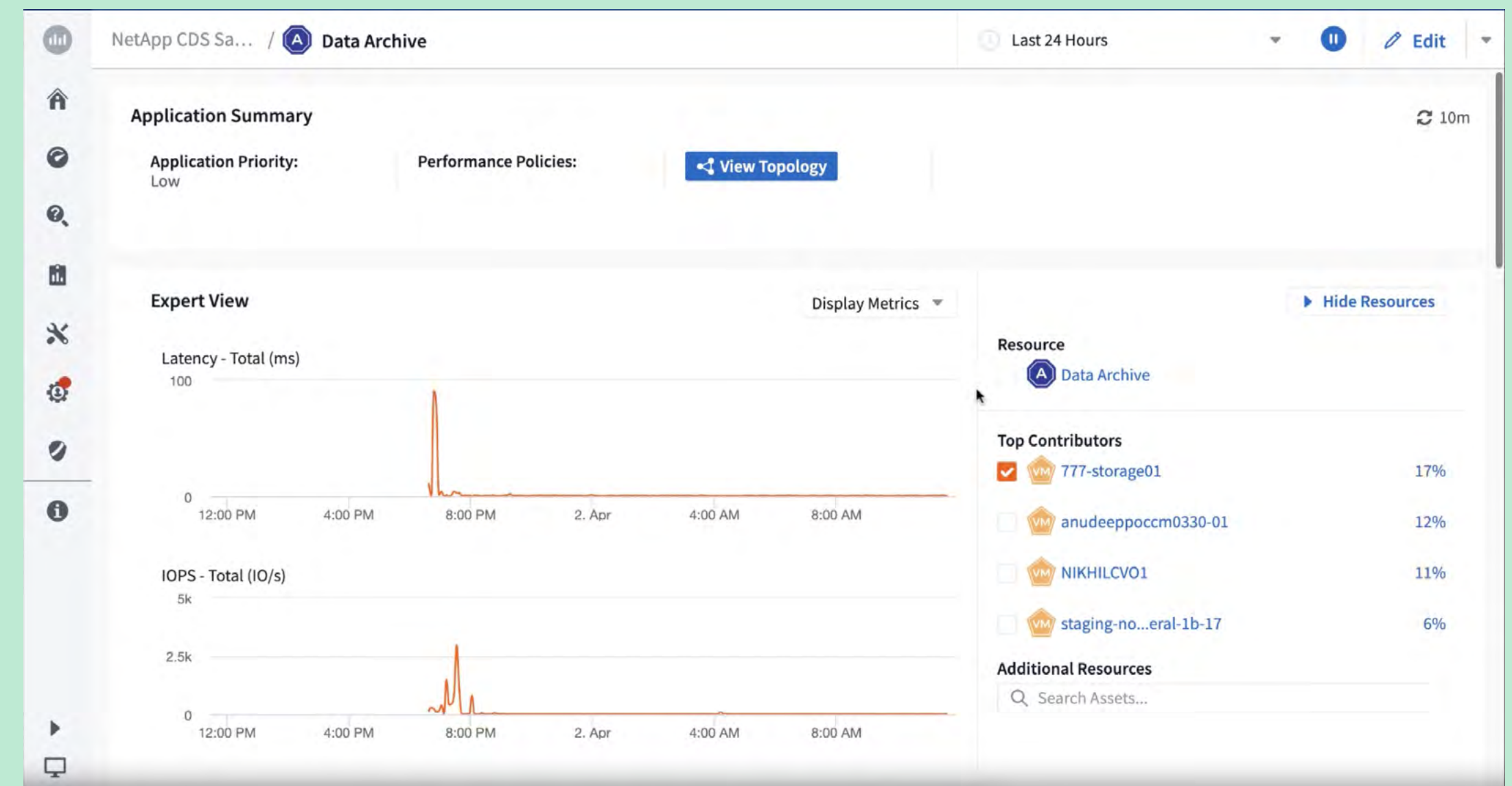


Figure 2. The Application Summary page for a data archive application.

How annotations can help

You can also use the application dashboard to track where resources are during a migration, as shown in Figure 3. Once the migration is complete, you can immediately see any resources that remain on the premises and whether there is any continuing activity before decommissioning.

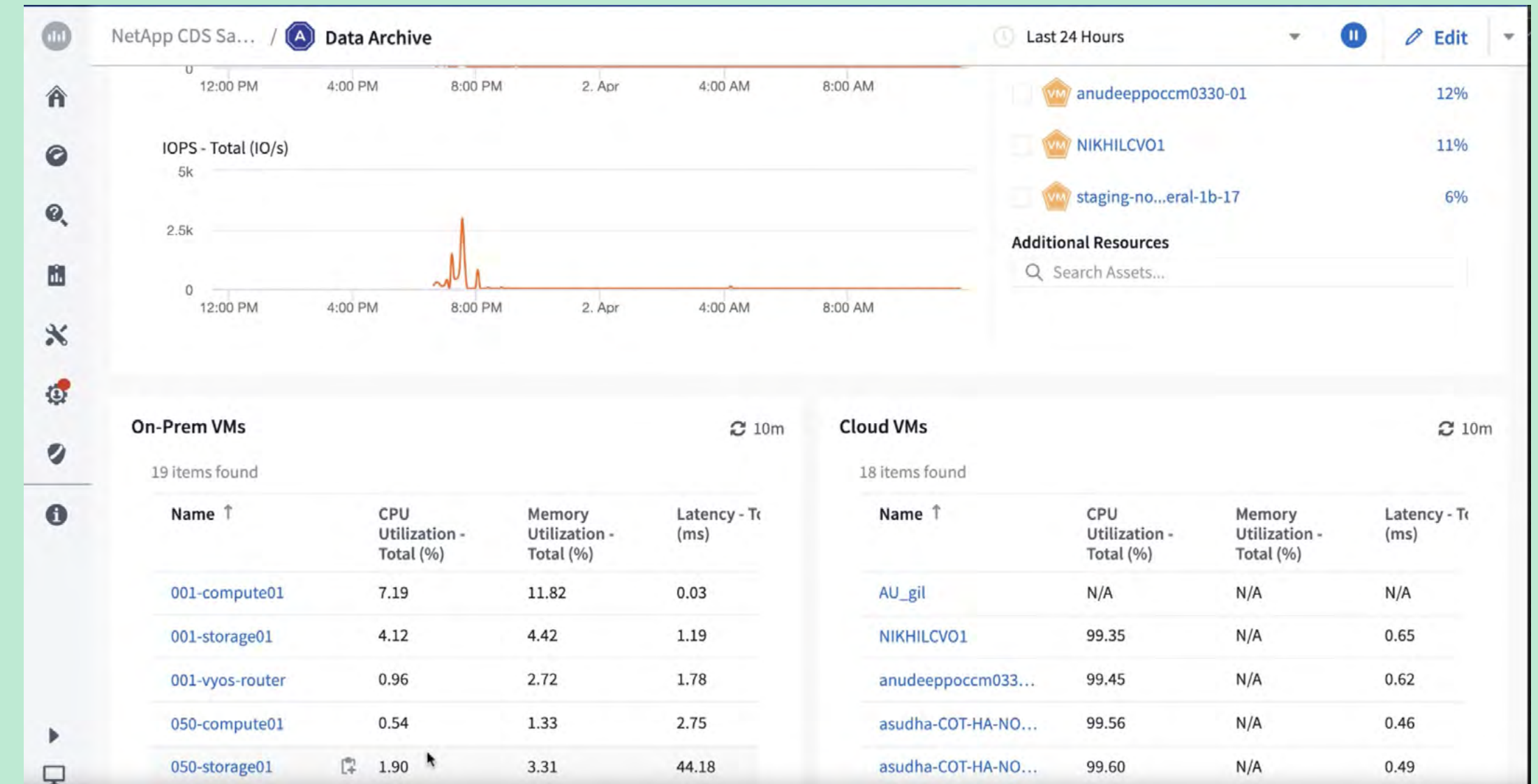
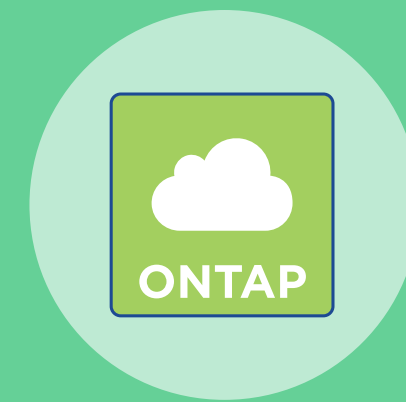


Figure 3. Tracking application resources during migration.

How annotations can help

Choose storage services with enterprise capabilities

For many enterprise IT teams, one of the challenges of cloud migration is that cloud storage services may lack the enterprise features they are accustomed to for data protection and data efficiency, requiring significant operational changes. NetApp addresses this need with a range of cloud data service options.



NetApp Cloud Volumes ONTAP®

This advanced solution brings the full capabilities of NetApp storage to the cloud. Cloud Volumes ONTAP provides secure storage services for AWS, Azure, and Google Cloud, combining data control with enterprise-class storage features such as snapshots, replication, cloning, deduplication, and compression. Support for both file shares and block-level storage enables you to run any enterprise workload in the cloud without giving up the capabilities your operations depend on.



Managed file services

Many enterprise applications and workflows require SMB or NFS file services. Cloud Volumes Service for AWS, Azure NetApp Files, and Cloud Volume Service for Google Cloud provide high-performance, no-compromise managed file services in your preferred public cloud.

3. Continuous monitoring during migration

Cloud Insights helps you avoid the blind spots that can occur when migrating VMs to the cloud and switching from on-premises to cloud monitoring tools.

Cloud Insights helps in two ways:

- It provides full visibility of the migration while it's happening.
- Monitoring follows the migration automatically with no tool changes.

Migration Visibility

With Cloud Insights configured to monitor your on-premises and cloud environments, dashboards are updated in real time as you move VMs to the cloud. This means that you see immediately what has been migrated and what hasn't, ensuring that nothing gets missed.

Once your migration is complete, Cloud Insights makes it easy to double-check that there's no activity on servers or storage before decommissioning. More than one migration has missed a physical server that was doing something critically important because it wasn't visible in vCenter. The problem was discovered the hard way after the server's storage was shut down.

Consistent data model across clouds

Cloud Insights provides built-in asset normalization to ensure that metrics are comparable across platforms. With its consistent data model, a VM is a VM whether it's in VMware or OpenStack, EC2, Azure, or anywhere else. Alerts and thresholds that you configure in one environment are automatically applied in a new environment after migration.

Continuous monitoring during migration

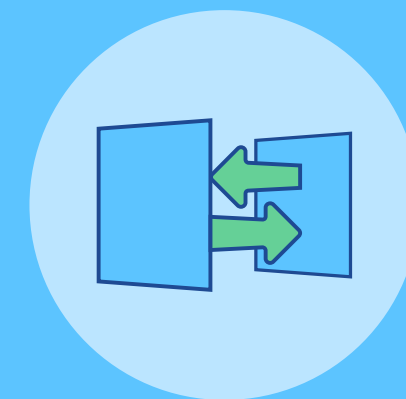
Advanced data services for data migration

A challenge for any cloud migration is minimizing the time needed to cut over an application from on-premises operation to cloud operation. NetApp offers several solutions that increase efficiency and simplify migration and cutover, including the following.



NetApp Cloud Sync

Rapid and secure data synchronization. Whether you need to transfer files between on-premises NFS or CIFS file shares, Amazon S3 object format, Azure Blob, IBM Cloud Object Storage, or NetApp StorageGRID® object-based storage, Cloud Sync moves files where you need them quickly and securely.



NetApp SnapMirror®

NetApp storage supports SnapMirror for fast, efficient, array-based data replication for backup, disaster recovery, and data mobility. Using SnapMirror, NetApp customers can quickly migrate data into Cloud Volumes ONTAP storage in AWS, Azure, or Google Cloud.

Continuous monitoring during migration

Monitoring that follows the application

Cloud Insights flexible alerts can help ensure that critical applications meet SLAs before, during, and after migration. As Figure 4 shows, you can create a new policy with just a few clicks and apply that policy to VMs or other objects that have a designated annotation.

Add Policy [X]

Policy Name: SAP alerts

Apply to Objects of Type: Virtual Machine

With Annotation: No Value

Annotation Value: VMs

Apply After a Window of: 5 minutes

With Severity: Warning

Email Recipients
Email will be sent to global recipient list. Click [here](#) to override.

Create alert if any of the following are true:

Latency - Read > 10 ms

+ Threshold

Stop processing further policies if alert is generated

Cancel Save

Figure 4. Creating a Cloud Insights policy.

Any time a new object is created with that annotation—whether the annotation is applied manually, by script, or via an automatic annotation rule—the policy automatically takes effect. This means that as application VMs are migrated and come online in the cloud, the same performance policies and alerts take effect immediately.

In other words, performance policies are sticky. All you have to do is set a threshold once and it applies everywhere.

- Monitoring follows migration with no extra effort.
- You don't need to set up new alerts in every new environment.
- You don't need to learn and use a new monitoring tool for every environment.

Using this approach ensures that SLAs are enforced after the migration with no changes, protecting the user experience before and after migration.

Continuous monitoring during migration

You can also create alerts that apply specifically to the migration process. Figure 5 shows a migration alert that is configured to be more sensitive for applications with a migration status of In Progress.

Add Policy [X]

Policy Name: Migration In Progress

Apply to Objects of Type: Virtual Machine

With Annotation: Migration Status

Annotation Value: In Progress

Apply After a Window of: 5 minutes

With Severity: Critical

Email Recipients
Email will be sent to global recipient list. Click [here](#) to override.

Create alert if **any** of the following are true:

- CPU Utilization - Total > 95 %
- Latency - Total > 15 ms
- Memory Utilization - ... > 80 %

+ Threshold

Stop processing further policies if alert is generated

Cancel Save

Figure 5. Creating an alert to monitor the migration process.

4. A single tool set simplifies operations and reduces risk

Implicit in the preceding sections is the idea that, with Cloud Insights, a single monitoring solution covers both on-premises and cloud environments. It's not necessary for teams to immediately learn new monitoring tools while they are migrating critical applications. Cloud Insights gives teams access to the same monitoring and troubleshooting tools everywhere and works identically across all environments.

By having Cloud Insights in place before a migration starts, you minimize the additional training required after migration. And you have a tool in place that everyone knows how to use on day one, a tool that works across your hybrid cloud, significantly reducing operational risk.

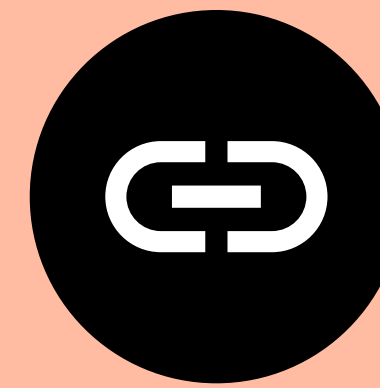


5. Getting started with Cloud Insights

This e-book explains how NetApp Cloud Insights and other tools simplify the process of lifting and shifting applications into the cloud with continuous monitoring during the transition.

To see Cloud Insights in action for yourself, register for a **30-day free trial**. Go to NetApp Cloud Central at <https://cloud.netapp.com/cloud-insights> to learn more about NetApp Cloud Insights and start your free trial.

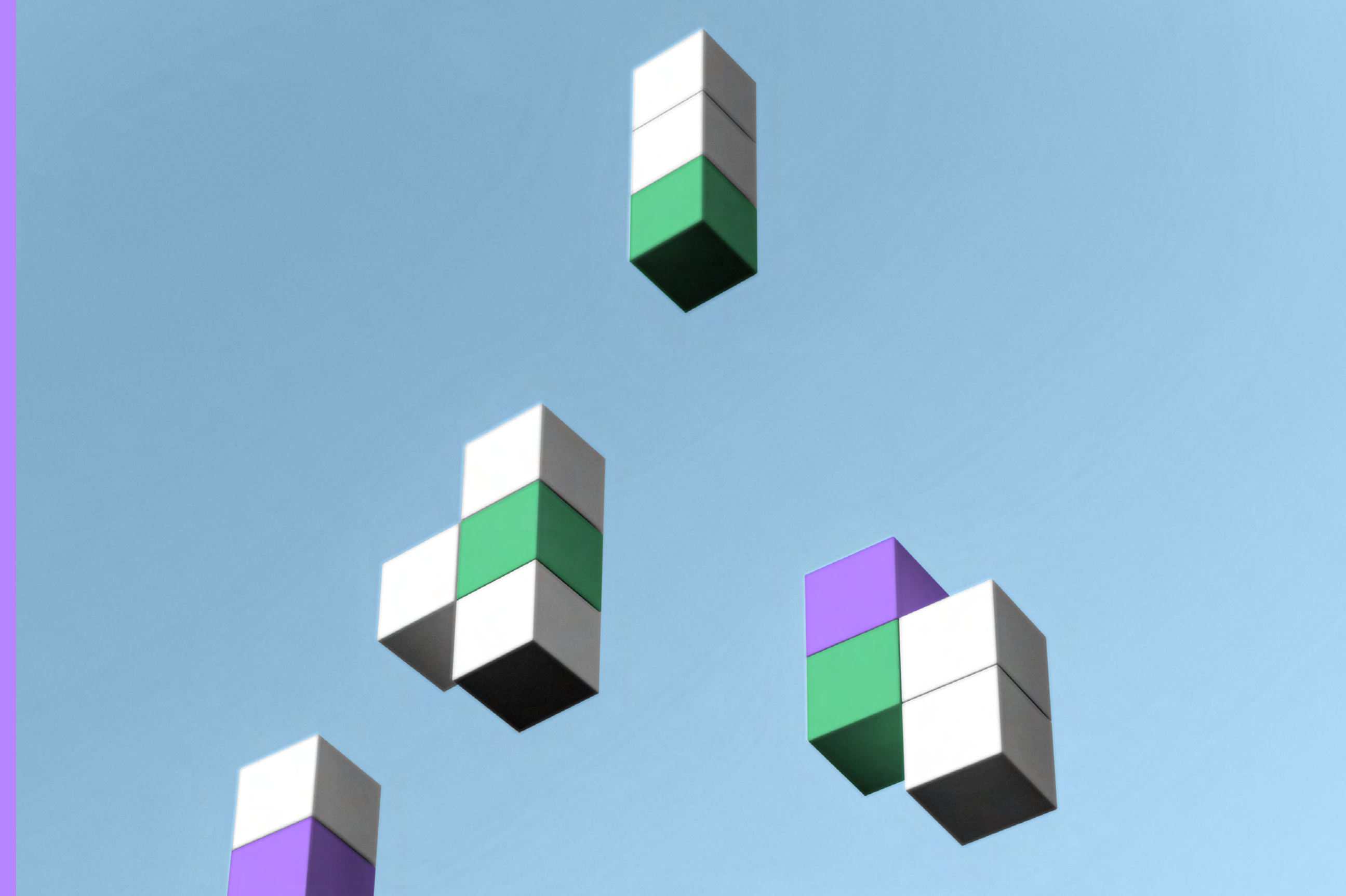
Additional resources



- [NetApp Cloud Insights: A new way to monitor your cloud infrastructure](#)
- Enhance monitoring by understanding the relationships [between resources](#)
- [Keep cloud costs at bay with queries in Cloud Insights](#)

6. About NetApp

➔ Learn more at 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.