White Paper

# NetApp Cloud Insights

## Optimize Your IT Infrastructure

Joshua Moore, NetApp
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## Abstract

Your IT environment is more complex and more dynamic than ever before. This makes tracking and controlling costs even more challenging. NetApp® Cloud Insights can help you achieve greater efficiency and optimization both in the cloud and on-premises. This white paper shows you how to configure Cloud Insights to identify areas of waste to reduce costs and optimize hybrid and multicloud IT operations.


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# 1 About This White Paper Series

This white paper is number four in a series about NetApp Cloud Insights, an innovative software-as-a-service (SaaS)-based monitoring tool that spans on-premises and cloud environments. Cloud Insights helps you monitor, troubleshoot, and optimize your hybrid cloud resources — from legacy hardware to container environments. The papers in this series cover the following topics:

- A New Way to Monitor Your Cloud Infrastructure | WP-7291
- Enhance Monitoring by Understanding the Relationships Between Resources | WP-7302
- Accelerate Troubleshooting Across Your Hybrid Cloud | WP-7308
- Optimize Your IT Infrastructure | WP-7319

This series focuses on both on-premises and cloud environments.

# 2 The Complexity of Understanding and Controlling Infrastructure Costs

Your IT infrastructure today is more complex than ever before, and this makes determining and controlling costs—both in the cloud and on-premises—more challenging.

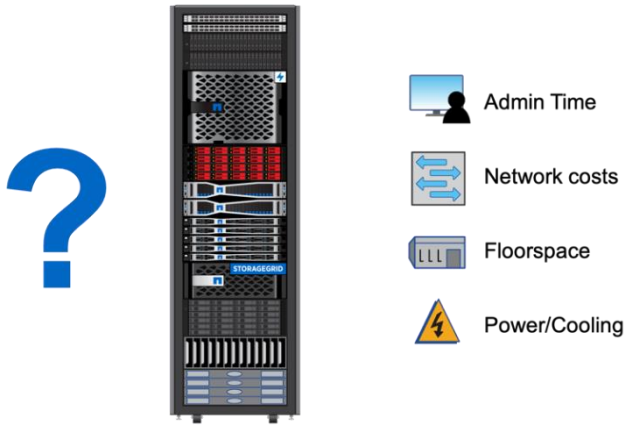
## 2.1 Cloud Costs

If you've provisioned resources in Microsoft Azure, Google Cloud, or Amazon Web Services (AWS), you already know that there are many factors that affect cost. For a compute instance, for example, the cost might depend on the number and type of CPUs, number and type of GPUs, amount of memory, type of storage, which region it's located in, whether it's on-demand or reserved, and so on. The situation is similarly complex for storage, and these are just two of the possible cloud building blocks. Across the three public clouds, there are more than 500 services available, making it extremely difficult to figure out the cost for any single resource or service, or compare similar services across clouds in an apples-to-apples fashion.

## 2.2 On-Premises Costs

We tend to assume it's easier to determine the cost of our on-premises infrastructure. However, at least cloud costs are written down. The true cost of on-premises infrastructure includes not only the costs for servers and storage resources used (capital expenditure (capex)), it also includes management costs, associated network costs, and facilities costs (operational expenditure (opex)). (See Figure 1.) Just as in the cloud, these costs vary with location.

**Figure 1) On-premises costs depend on management, networking, and facilities costs in addition to upfront capital costs.**

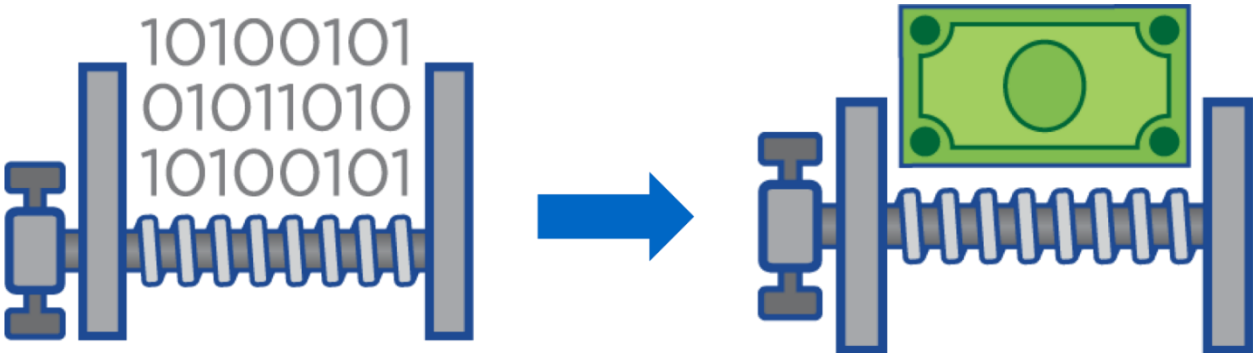



This can make it extremely difficult in practice to know exact costs or to arrive at a per-virtual machine (VM) or per-gigabyte (GB) cost that can be compared to public cloud.

## 2.3 Keep It Simple: Focus on Identifying and Reducing Waste

A practical way to address the uncertainties in determining and optimizing costs both in the cloud and on-premises is to keep things simple. Regardless of how much you're spending on a given resource, if you use less of that resource, it will cost less. This is particularly true in the cloud where you might consume many resources on demand (Figure 2).

**Figure 2) NetApp Cloud Insights enables you to quickly identify wasted resources to optimize costs.**



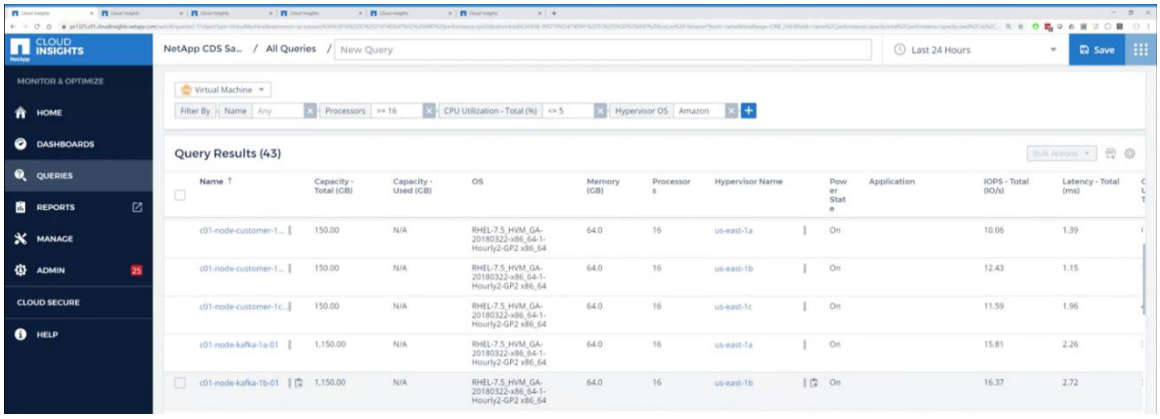

NetApp Cloud Insights can help you achieve greater efficiency and optimization both in the cloud and on-premises. This white paper explores the optimization capabilities of Cloud Insights in more depth, showing you how to configure Cloud Insights to identify areas of waste—and the individuals responsible—and thereby reduce costs. While the examples in this paper focus on public cloud, the same approaches apply to reduce the waste of on-premises resources—and potentially deferring the need for additional data center investments.

# 3 Using Cloud Insights Queries

Cloud Insights includes an easy-to-use but powerful query mechanism that provides a set of filters and finders that allow you to quickly zero in on sets of resources. Queries are explained in detail in an earlier white paper in this series: WP-7302.

For example, suppose you want to identify all the large compute instances (meaning, the most expensive ones) in AWS that are underutilized. Cloud Insights makes it simple to create a query to do this, as illustrated in Figure 3.

**Figure 3) Example ad hoc query to find large AWS compute instances with low utilization.**




To create a query like that shown in Figure 3, you simply add elements to the query from the available menu items. In this case, the query specifies: resources of type Virtual Machine; with more than 16 processors; with CPU utilization less than 5%; running on the AWS hypervisor. For the NetApp lab environment, this results in a manageable set of results. The results can be narrowed even further by adding elements to the query. The same general approach can be used to zero in on waste in any resource. For example, you might create a query to identify storage volumes on expensive, high-performance storage types that have low IOPS.

Once you've identified a list of wasted resources, there are several actions you can take:

- Export the list to a file and send it to the bill payer for follow-up.
- Drill down on each item in the list, then identify and contact the owner to find out if it can be reclaimed, right sized, and so on.
- Tag each resource and monitor it over time to see if it remains underutilized.

## 3.1 About Cloud Insights

NetApp makes it simple to get started with Cloud Insights. However, to get the most from your Cloud Insights environment, you should take some additional steps, including configuring annotations, queries, alerts, and dashboards specific to your environment:

- **Annotations**. Some information can't be obtained through discovery alone. By using annotations, you can add custom metadata that is specific to your IT and business needs. Cloud Insights provides a set of default annotations that you can use, plus you can create your own annotations to slice monitoring data in other ways. Annotation rules can be created that assign the appropriate annotations to new resources as they come online automatically.
- **Queries**. Cloud Insights provides a powerful visual search engine with filters and finders that enable you to monitor and troubleshoot a hybrid cloud environment easily. You can search assets at a granular level based on various criteria, including annotations and performance metrics. You can also define rules to annotate resources based on these query results to automatically tag new assets without any manual intervention.
- **Alerts**. You can create performance policies to generate alerts when a resource exceeds a specific SLI. This feature enables you to proactively monitor your environment to detect problems before they affect your operations. You can easily create targeted alerts to detect problems while reducing the noise in your monitoring environment to avoid alert fatigue.

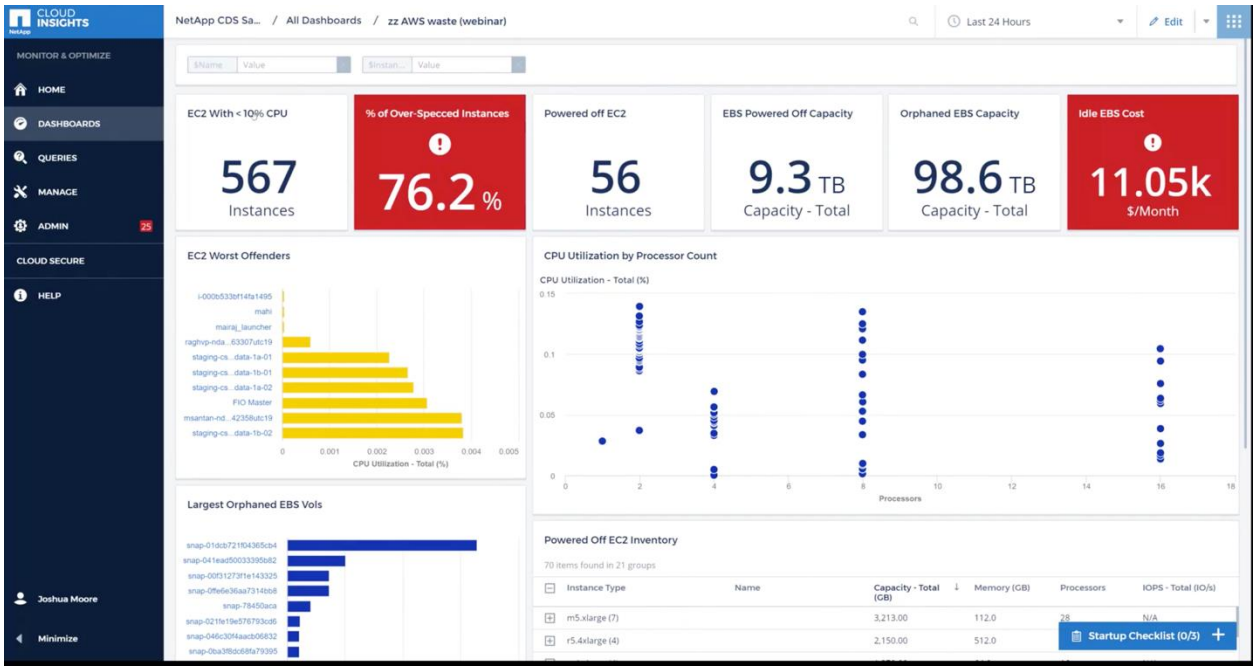
- **Dashboards**. Cloud Insights comes with a default set of dashboards based on the data collectors that you enable. Each dashboard is designed to help you answer specific questions about your environment. Your team can also create highly tailored dashboard views to meet diverse monitoring and troubleshooting needs. You can start from an existing dashboard and customize it, or you can create entirely new dashboards from scratch using powerful tools to visualize available data.

These capabilities are described in detail in the White Paper Enhance Monitoring by Understanding the Relationships Between Resources | WP-7302, including tips on configuring and using each feature.

# 4 Using Cloud Insights Dashboards

You can also use Cloud Insights to create custom dashboards for the express purpose of identifying and tracking wasted resources. The example shown in Figure 4 is designed to identify and track wasted compute instances (EC2 instances) and block storage (EBS storage) capacity in AWS.

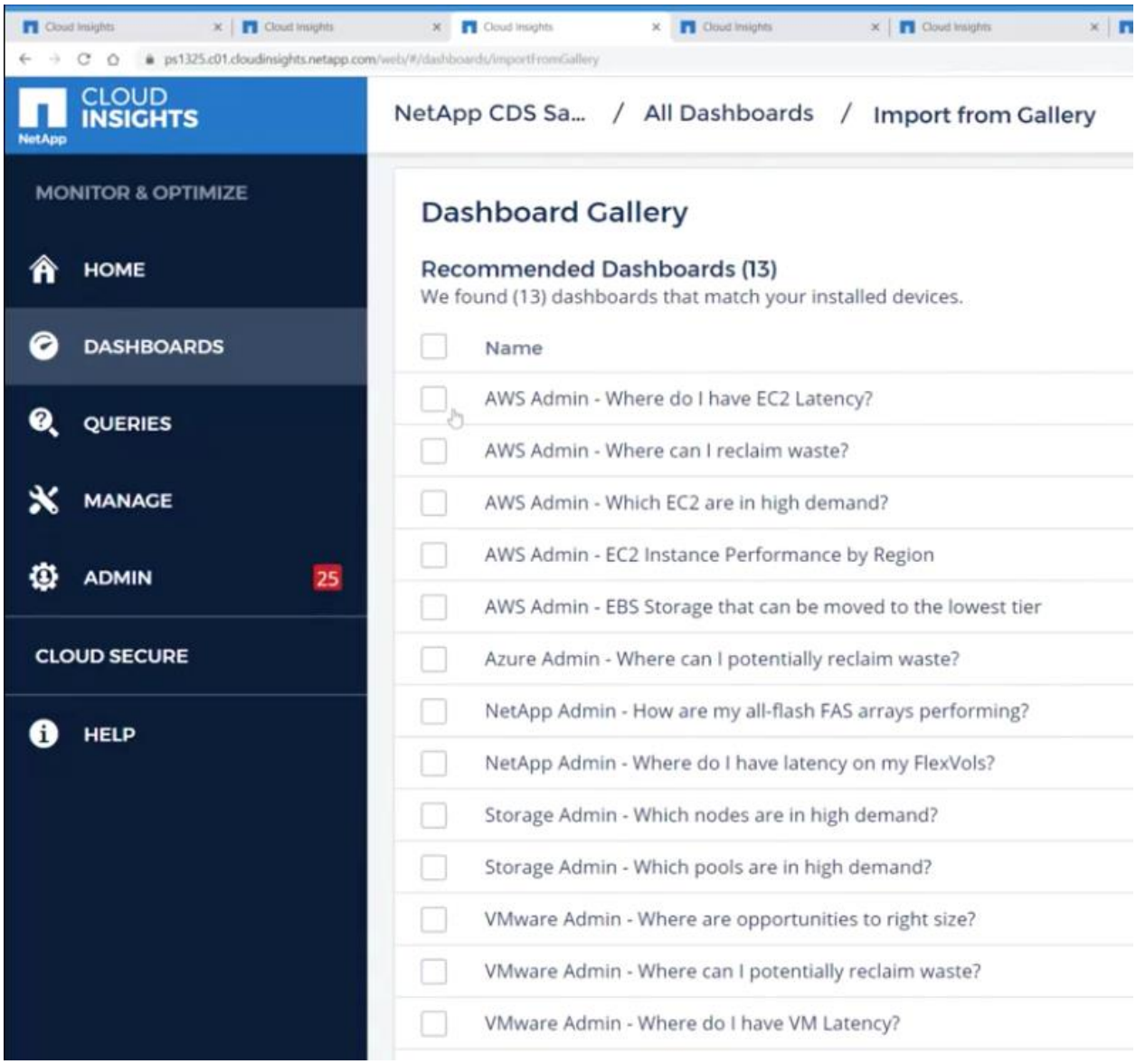
**Figure 4) Example Cloud Insights dashboard showing waste in AWS.**




This dashboard shows high-level EC2 and EBS statistics across the top, including idle and powered off compute instances and storage. The four detail panes provide more detail on wasted resources. From a dashboard like this, you can drill down to find out more about a resource by clicking on it. This type of dashboard allows you to quickly identify the biggest opportunities for reclaiming wasted resources, and take action as described in the previous section.

To create your own custom dashboards to track resource waste, you have two options. When you add a data collector (as described in earlier papers in this series), you are presented with a gallery of relevant dashboards to choose from. An example is shown in Figure 5. As you can see, many of the recommended dashboards focus on reclaiming waste, right sizing compute instances, and re-tiering storage volumes.

**Figure 5) Dashboard Gallery showing available options based on installed data collectors.**

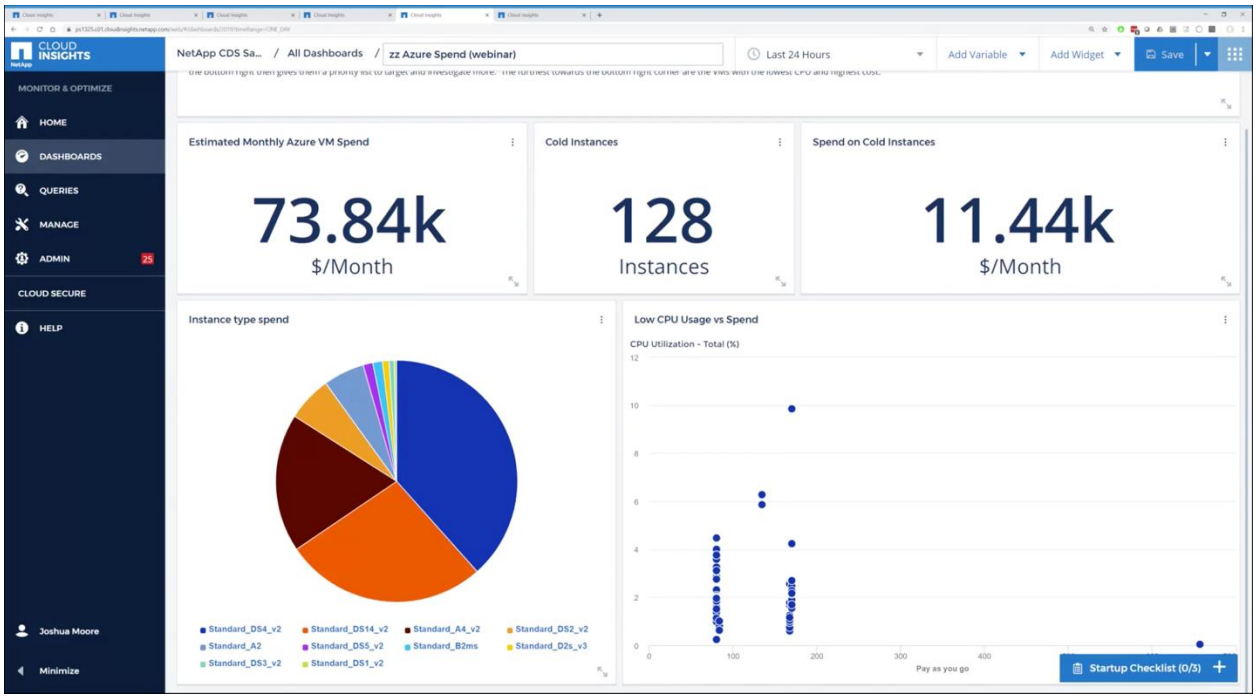



You also have the option to create your own custom dashboards, either by modifying an existing dashboard to meet your needs or creating entirely new dashboards from scratch. More details on creating custom dashboards are discussed in WP-7302.

# 5 Incorporating Cost Information in Cloud Insights

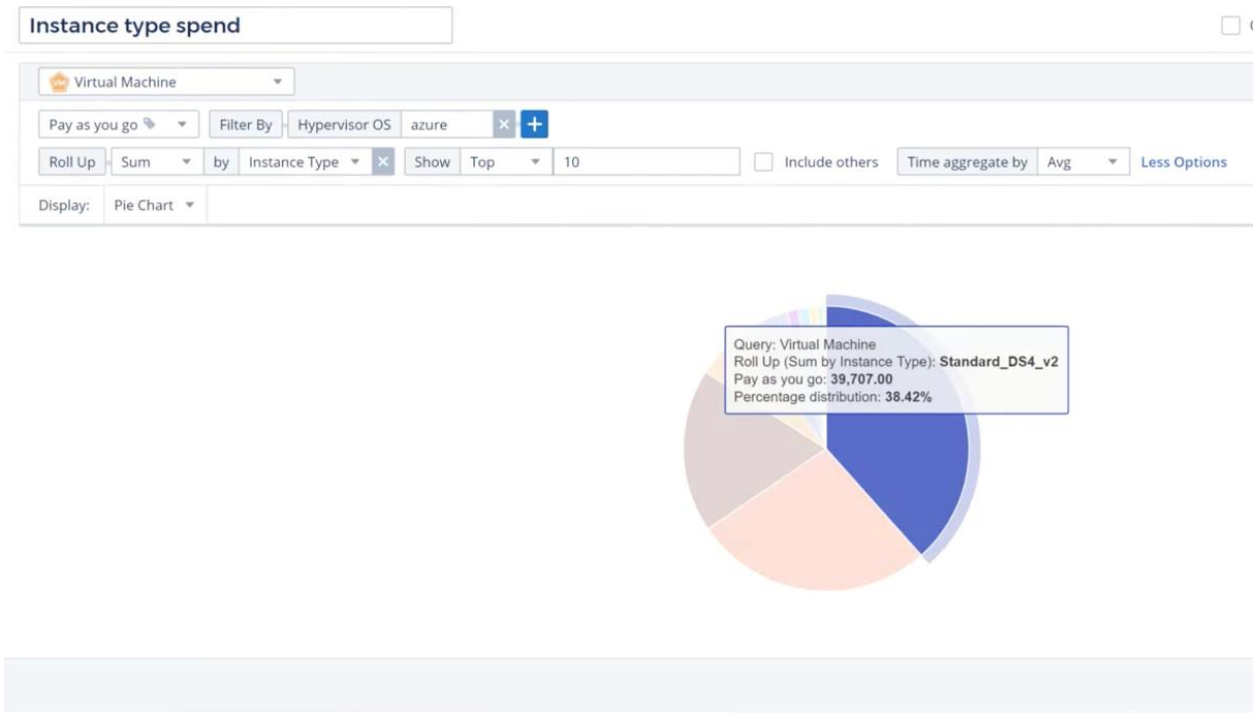
You might have noticed that the dashboard shown in Figure 4 incorporates AWS cost information. Figure 6 shows an example of an Azure dashboard with several additional cost views.

**Figure 6) Custom Azure dashboard showing cost metrics.**




The panel in the lower left of the dashboard breaks down spending by instance type. By clicking on the three vertical dots in the top right of the panel and selecting Edit, you can see how this is accomplished, as shown in Figure 7.

**Figure 7) A widget to show Azure spending by instance type.**



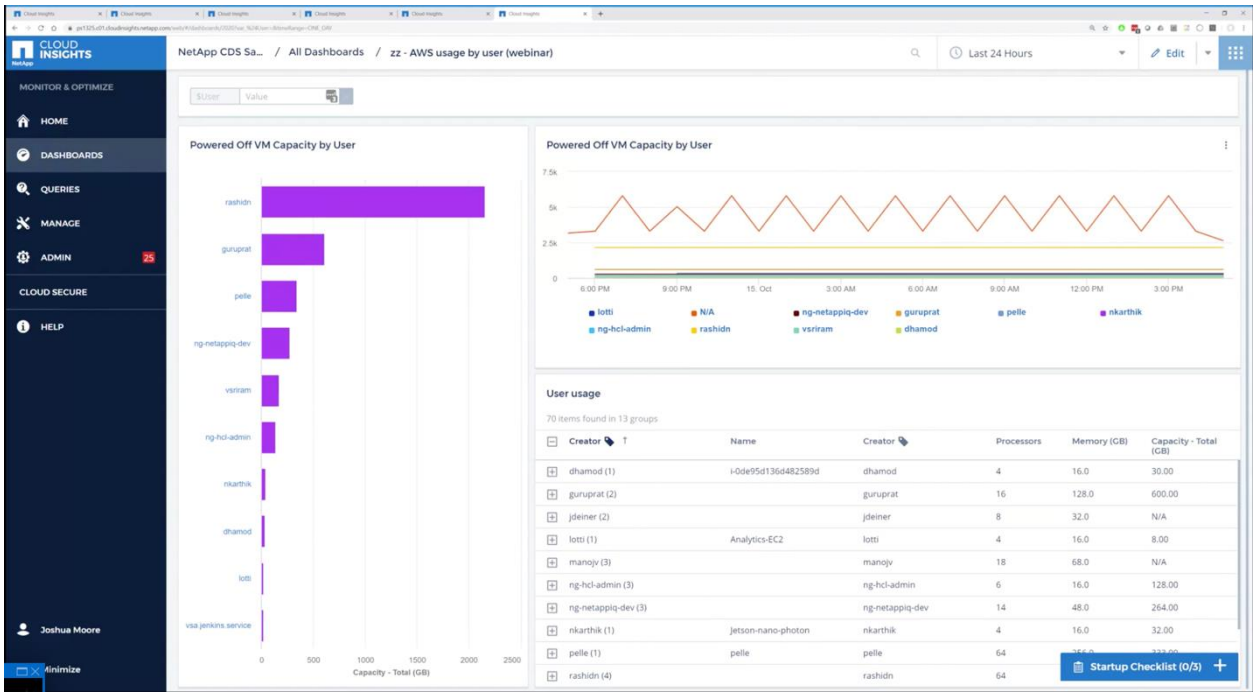
Note the similarity between this process and that of creating a query as shown in Figure 3. In this case, we are filtering resources of type Virtual Machine, that have the Pay As You Go tag. We then roll the data up by Instance Type in the resulting pie chart.

Cloud Insights includes a flexible metadata engine with customizable tags or annotations. Metadata associated with the Pay As You Go tag includes the on-demand costs for each Azure instance type, providing accurate cost information that can be manipulated and reported. You can create simple rules to tag instances with these costs based on instance type or use the Cloud Insights API for greater flexibility.

# 6 Shameback Reporting

Using Cloud Insights metadata, you can associate each individual resource with a creator. This enables reporting at varying levels of granularity all the way down to individual users, as shown in the example dashboard in Figure 8.

**Figure 8) Example AWS dashboard showing usage by user.**




Many of the reporting tools available—if they identify potential resource waste at all—provide a very top down view of costs and usage. This can be useful for bill payers, but often the administrators, engineers and developers incurring these costs in the first place don't use them. Typical showback and chargeback reports simply provide visibility of costs but not what cost is associated with waste. This Cloud Insights capability can empower you to control your own usage and limit waste.

With a dashboard like Figure 8, you can immediately see the information you need to clean up after yourself. These views can be integrated into the daily workflows of front-line engineers, along with performance and capacity metrics, to proactively control waste. Many users are conscientious and want to use resources efficiently, they just need the tools to help them identify the resources they might have forgotten. Even less conscientious users probably don't want their names visible at the top of the list for long. That is why reports like this are sometimes referred to as shameback rather than showback reports.

# 7 Summary and Next Steps

NetApp Cloud Insights can help you monitor, troubleshoot, and optimize your infrastructure. This paper examines the optimization capabilities of Cloud Insights, explaining how you can quickly identify wasted resources—like idle VMs and orphaned storage volumes—in the cloud and on-premises. Cloud Insights goes beyond typical chargeback and billing reports, showing usage down to the granularity of individual users.

To learn more, go to NetApp Cloud Central at https://cloud.netapp.com/cloud-insights, where you can experience Cloud Insights with a 30 day free trial.

## Where to Find Additional Information

To learn more about the information that is described in this document, review the following documents and/or websites:

- NetApp Cloud Central
  https://cloud.netapp.com/cloud-insights
- NetApp Cloud Insight Documentation Center
  https://docs.netapp.com/us-en/cloudinsights/
- NetApp Product Documentation
  https://docs.netapp.com

## Version History

| Version | Date | Document Version History |
|---|---|---|
| Version 1.0 | February 2020 | Initial release. |

Refer to the Interoperability Matrix Tool (IMT) on the NetApp Support site to validate that the exact product and feature versions described in this document are supported for your specific environment. The NetApp IMT defines the product components and versions that can be used to construct configurations that are supported by NetApp. Specific results depend on each customer's installation in accordance with published specifications.

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