



AMAZON CLOUD: THE ULTIMATE GUIDE TO COST MANAGEMENT

Intro

Market leader AWS has an extensive range of cloud computing services on its portfolio, and is the financially ideal IT platform for web scale organizations and enterprises. According to [IDC research](#), enterprise users that have leveraged AWS have gained 64.3% savings when compared with deploying the same resources on-premises or in hosted environments.

However, it's also known that the move from CAPEX to OPEX not only alters the way resources are purchased, but how cloud usage and costs are measured and controlled as well. It can be challenging to comprehend the AWS costs variations, keep up with the highly dynamic environment and grapple with your monthly invoice. However, as long as the environment is under control and continuously optimized, AWS can be an a perfect cloud for your enterprise.

In this whitepaper, we highlight the overarching financial challenges associated with AWS, and provide multiple solutions to help you manage your AWS cloud environment costs.

Challenges and the lack of visibility

Each AWS user can experience a multitude of challenges when trying to understand AWS costs and cloud consumption. Here are some of the most commonly noted issues.

Multiple Pricing Models

We examined the AWS calculator and found that it offers over 75,000 options. This clearly makes purchasing decisions very complicated.

AWS offers multiple pricing models. It starts with the basic pay-as-you-go model, but also allows you, for example, to invest in long term commitments by purchasing Reserved Instances (RIs), or leverage high-volume discounts on storage and data transfer. The comprehensive cloud platform also offers special pricing for spot instances, which allows you to purchase instances at a very low cost for non-critical environments. With so many pricing models and resource types, it's easy for users to choose an incompatible option that can have a direct impact on their environment efficiency and business.

Lack of Control

Contrary to rigid traditional on-premise environments, the cloud is a highly dynamic environment. Think about an environment that consists of hundreds or even thousands of instances which auto scale with demand, multiple databases and TBs of storage that constantly grow. Being able to detect usage changes is crucial to making educated decisions and taking the necessary steps to improve. In addition, enterprises need to allocate costs per application, cost center or even a specific user. However, traditional methods and tools lack the level of granularity and flexibility needed in order to understand the cloud environment activity.

Another scenario, for example, is when an account experiences DDOS attacks. During such events, the sudden spike in network traffic can result in high resource usage and great costs. In this case, it's important for an organization to be able to detect these types of events early, and receive a notification when usage and costs have skyrocketed. Lack of visibility within the dynamic environment results in uncontrolled and eventually inefficient cloud operations.

Resource Utilization

Traditionally enterprise IT has over-purchased physical resources in order to eliminate future demand growth risks. In the cloud, you can start small and grow your capacity as your demand changes in size, without running the risk of wasted funds or unutilized physical resources.

However, as mentioned above AWS EC2 has hundreds of instance types from various generation families. That presents IT with the challenge of selecting the resources that will retain the right balance between the required compute power, performance and price. It's common for IT to select the wrong size (in most cases by over provisioning), and might end up paying a higher amount than your planned budget. The challenge is to be able and understand the utilization levels and demand and be able to continuously adjust in order to create an efficient environment. The lack of visibility into resource utilization leads to the inability to make decisions regarding, for example, resource size or autoscale thresholds.

Budgeting and Forecasting

Without extensive previous knowledge of your actual usage and cost, including allocations to specific lines of business (LOBs) and organizational groups, it's difficult to plan for the future. In order to create a well-thought-out and calculated budget, you need to have the visibility and be able to analyze past usage trends aligned with your application's performance before creating your quarterly or annual cloud budget. In order to avoid resource sprawl and exceeded budgets, you need to consistently monitor your accounts and forecast your next month's usage and invoice. This can be particularly challenging for large enterprise IT that need to plan and monitor a budget that meets the needs of multiple departments and projects.

AWS Cost Management

Plan

If you plan to migrate from your on-premise to AWS, you can use [AWS TCO \(total cost of ownership\) calculator](#) to compare your current on-premise operations costs to AWS' costs, or use [AWS simple monthly calculator](#) to estimate your planned cloud environment costs. Though this might not give you the most realistic or concrete information that you need, it will give your organization an initial idea of where to start. It's also recommended to start on a smaller scale instead of fully investing from the beginning. This will give you the opportunity to gain a better understanding of AWS functionalities and costs before fully committing to it. Make sure you leverage AWS' free tier in order to learn and acclimate to the service.

Control

1. Tag

In order to allocate costs per LOB, ad-hoc projects or even specific systems tiers, enterprise should use cost allocation tags to categorize and track the specific resource pools costs. Applying tags on your cloud resources including instances and S3 buckets you will be able to retrieve a cost allocation report (CSV file) with aggregated costs data. However, this will require a great deal of parsing and coding to comprehend its contents.

2. Monitor

AWS CloudWatch helps to monitor billing and budgeting, and allows you to set up alerts that notify you regarding high usage spikes. This helps prevent the issue of sporadic cost increases

that can easily happen due to increase in demand, or even a bug in your autoscale configuration. It's also recommended to set up multiple alerts for increased usage in your budget (e.g. an alert at \$200/\$500/\$1000/\$5000) to stay as up-to-date as possible.

3. Analyze

AWS also offers [Cost Explorer](#) and [Trusted Advisor](#) (which are only available within AWS premium support). As your needs and complexities develop, you might want to consider using a 3rd party tool such as [CloudCheckr](#) (see below) for deeper, more comprehensive, and automated visibility. These services will advise you and send notifications for various optimization opportunities, such as the reserved instance purchases, low utilized instances, underutilized EBS volumes and unassigned elastic IPs (EIPs).

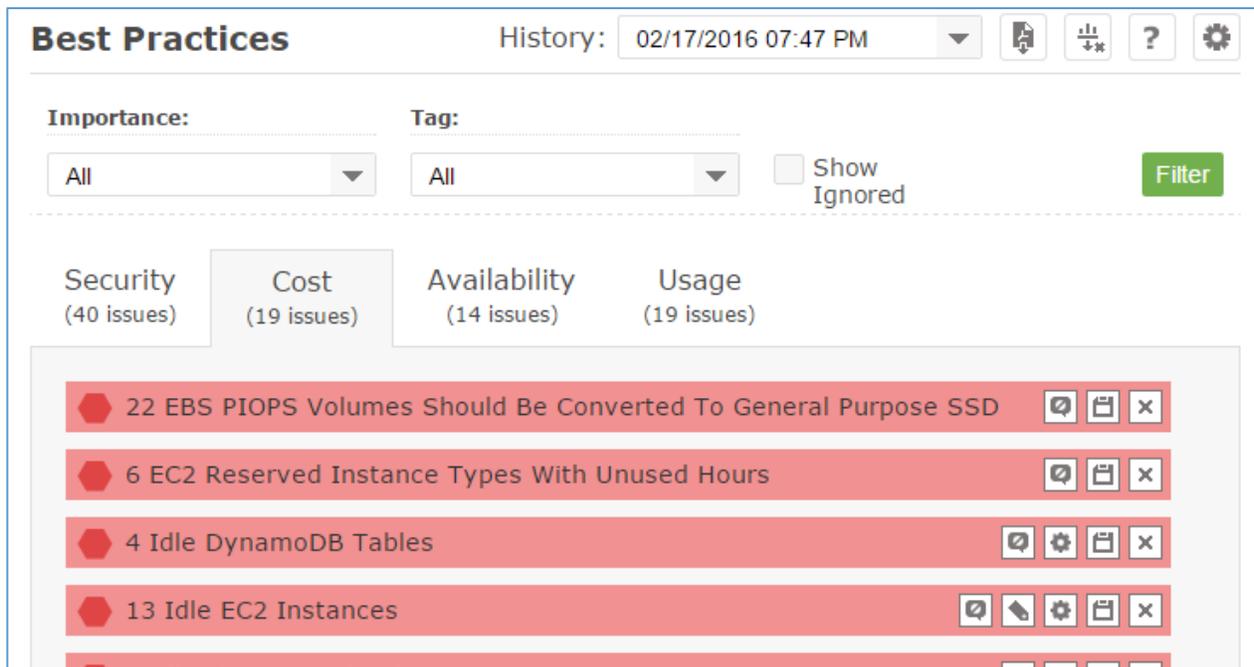


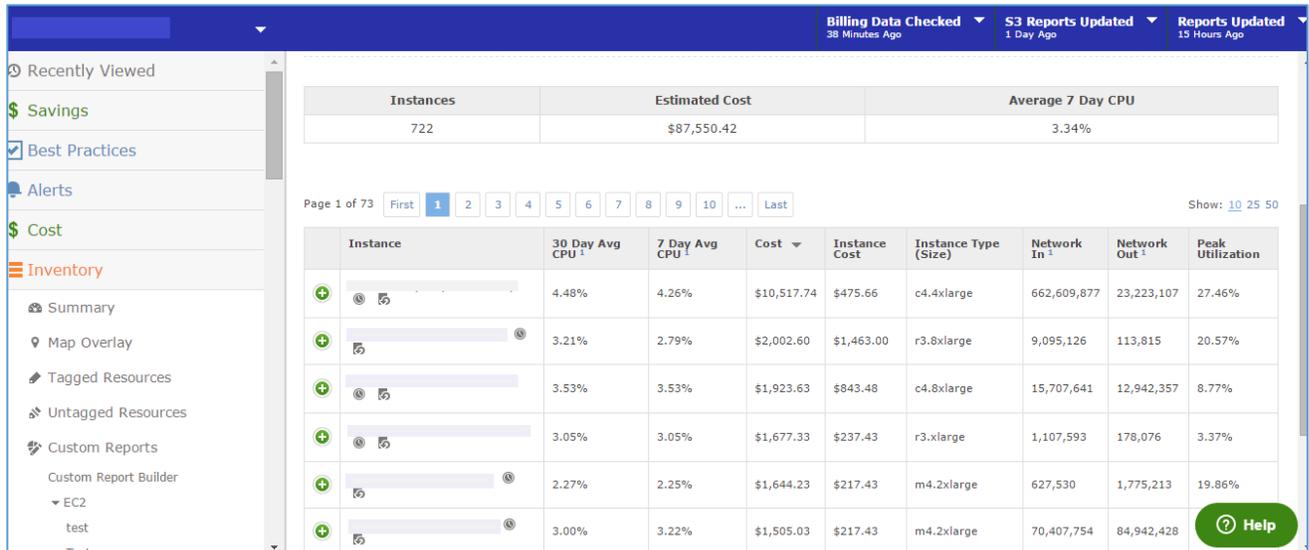
Image 1: CloudCheckr Insights Dashboard

Optimize

Once the environment is set up and running on AWS, it must be adjusted continuously to fit current demand while leveraging AWS' various pricing models. If your organization is planning to use EC2 instances continuously, you need to be able to understand your constant capacity and leverage the Reserved Instance (RI) model, which [according to Amazon](#) can help you save up to 70% in AWS usage. If you want to run non-mission critical applications, you might want to

use the EC2 Spot Instance option, which can result in 50-90% savings. An organization can use mixed pricing with RI, Spot and On-Demand by using scalability effectively. The combination will give you reservation with RI, scalability with On-Demand and Spot, and cost savings with Spot. The advantage of this combination is that it will allow you to launch instances with minimum required capacity and scale on a need-basis.

This is one of the important multiple optimization options that you can leverage. You should also continuously look for and shut down idle capacity, and scale down and consolidate underutilized instances. You will be able to make the most informed purchase decisions if your capacity and usage are closely monitored.



Instances	Estimated Cost	Average 7 Day CPU
722	\$87,550.42	3.34%

Instance	30 Day Avg CPU ¹	7 Day Avg CPU ¹	Cost	Instance Cost	Instance Type (Size)	Network In ¹	Network Out ¹	Peak Utilization
[Instance Icon]	4.48%	4.26%	\$10,517.74	\$475.66	c4.4xlarge	662,609,877	23,223,107	27.46%
[Instance Icon]	3.21%	2.79%	\$2,002.60	\$1,463.00	r3.8xlarge	9,095,126	113,815	20.57%
[Instance Icon]	3.53%	3.53%	\$1,923.63	\$843.48	c4.8xlarge	15,707,641	12,942,357	8.77%
[Instance Icon]	3.05%	3.05%	\$1,677.33	\$237.43	r3.xlarge	1,107,593	178,076	3.37%
[Instance Icon]	2.27%	2.25%	\$1,644.23	\$217.43	m4.2xlarge	627,530	1,775,213	19.86%
[Instance Icon]	3.00%	3.22%	\$1,505.03	\$217.43	m4.2xlarge	70,407,754	84,942,428	

Image 2: CloudCheckr Inventory Reports

Leverage AWS Ecosystem

With the continuous growth of AWS ecosystem, there has also been an increase in cost management solution providers which help gather large amounts of detailed usage and cost data. These solutions can support enterprises with large cloud footprints on multiple AWS accounts. They provide a simple user experience with dashboards, reports and notification systems. They also provide comprehensive customized reports and invoicing for cost allocation and chargeback purposes. One of the main advantages is the consolidated view, which supports the visibility across multiple accounts and regions and provides out-of-the-box optimization recommendations, such as RI purchase opportunities.

Finally, when choosing a 3rd party solution such as [CloudCheckr](#), it's important to qualify the depth of the analysis capability for both usage and cost allocation and optimization since your cost complexity will grow exponentially. You should also judge the solution's applicability across your organization. In the cloud, cost is not isolated from inventory and security issues. Look for a solution that offers broader functionality and allows tie-in with your other IT management functions.

Summary

AWS disrupts the traditional IT world and will continue to do so within the foreseeable future. It changes the way you purchase your servers, which is one of the basic elements in enterprise IT. It accelerates innovation and is being utilized by the largest web-scale modern enterprises in

the world. However, the changes also create new challenges, one of which being the management of costs within a dynamic virtual environment. And last but not least, planning your cloud deployment should also involve picking the right tools and methods to have clear visibility into capacity, utilizations and costs.

About CloudCheckr

CloudCheckr is a web-based software application that allows you to see and understand what is going on within your Amazon Web Services deployments.

Amazon provides the Amazon Management Console to configure and setup your AWS account. CloudCheckr picks up from there. It does not replace the functionality of the Amazon Management Console – in fact you don't ever make any updates to AWS through [CloudCheckr](#). CloudCheckr is designed to report on and analyze what resources you are and are not using, where your spending is not optimized, what your account looked like historically, and what is changing in your account.

CloudCheckr uses the Amazon Web Services API to look at your AWS setup. CloudCheckr connects to your AWS account and grabs a "snapshot" of all of the settings and details on your account. This snapshot is then used to analyze your usage, costs, and to provide best practice advice.

CloudCheckr Capabilities:

- [Discover and visualize what's running in AWS](#)
- [Understanding costs in AWS](#)
- [Analyze your usage in AWS](#)
- [Monitor for changes in your AWS environment](#)
- [Hundreds of best practice checks covering security, availability, cost, and usage](#)
- [Maintain a historical record of your cloud configuration](#)

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